



**The impact of funding deadlines on personal workloads,
stress and family relationships: a qualitative study of
Australian researchers**

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2013-004462
Article Type:	Research
Date Submitted by the Author:	12-Nov-2013
Complete List of Authors:	Herbert, Danielle; Queensland University of Technology, Institute of Health and Biomedical Innovation Coveney, John; Flinders University, School of Medicine Clarke, Philip; The University of Melbourne, Melbourne School of Population and Global Health Graves, Nicholas; Queensland University of Technology Barnett, Adrian; Queensland University of Technology
Primary Subject Heading:	Public health
Secondary Subject Heading:	Qualitative research
Keywords:	PUBLIC HEALTH, QUALITATIVE RESEARCH, MENTAL HEALTH, MEDICAL EDUCATION & TRAINING

SCHOLARONE™
Manuscripts

Title The impact of funding deadlines on personal workloads, stress and family relationships:
a qualitative study of Australian researchers

Authors Danielle L Herbert, John Coveney, Philip Clarke, Nicholas Graves, Adrian G
Barnett

Address for each author DLH, NG, AGB: School of Public Health and Social Work &
Institute of Health and Biomedical Innovation, Queensland University of Technology, 60
Musk Ave, Kelvin Grove, Brisbane, Queensland 4059, Australia.

DLH: Postdoctoral Research Fellow. NG: Professor of Health Economics. AGB: Principal
Research Fellow.

JC: School of Medicine, Flinders University, GPO Box 2100, Adelaide, South Australia
5001, Australia.

JC: Professor of Public Health.

PC: Melbourne School of Population and Global Health, The University of Melbourne, 207-
221 Bouverie St, Parkville, Melbourne, Victoria 3010, Australia.

PC: Professor of Health Economics.

Corresponding author

DLH: Danielle L Herbert Email: d2.herbert@qut.edu.au

Abstract word count: 280

Manuscript word count: 4167

Abstract

Objective To examine the impact of applying for funding on personal workloads, stress and family relationships.

Design Qualitative study of researchers preparing grant proposals.

Setting Web-based survey on applying for the annual National Health and Medical Research Council (NHMRC) Project Grant scheme.

Participants Australian researchers (n=215).

Results Almost all agreed preparing their proposals always took top priority over other work (97%) and personal (87%) commitments. Almost all researchers agreed that they became stressed by the workload (93%) and restricted their holidays during the grant writing season (88%). Most researchers agreed that they submitted proposals: because chance is involved in being successful (75%), due to performance requirements at their institution (60%), and pressure from their colleagues to submit proposals (53%). Almost all researchers supported changes to the current NHMRC processes to submit proposals (95%) and peer-review (90%). Most researchers (59%) provided extensive comments on the personal impact of writing proposals. Six major work–life themes were: 1) top priority; 2) career progression; 3) stress; 4) benefits; 5) time spent at work; and 6) pressure from colleagues. Six major home–life themes were: 1) family holidays and conflicting timing; 2) time spent on work at home; 3) impact on children; 4) stress at home; 5) impact on family, partner and friends; and 6) direct impact on partner. Additional impacts on the mental health and well-being of researchers were identified.

Conclusions The process of preparing grant proposals for a single annual deadline is stressful, time consuming and conflicts with family responsibilities. The timing of the NHMRC funding cycle could be shifted to minimise applicant burden. These changes would give Australian researchers more time to work on actual research and be with their families.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Strengths and limitations

- This is the first Australian study providing empirical evidence of the significant negative impact of applying for a single annual funding deadline on researchers’ productivity, health and well-being.
- This study found the process of preparing grant proposals is stressful, time consuming and conflicts with responsibilities for children and family.
- Researchers responding to the survey may not be representative of the complete population of researchers however they did report a history of successfully gaining funding.
- The costs to the mental health and well-being of the researcher or their family members could not be quantified in this study and requires further examination.

Introduction

Large amounts of time are invested by academics preparing funding proposals to support their research. A successful proposal provides an obvious pay-off but the costs could be felt personally with stress placed on private lives during grant writing seasons, and subsequent rebuttal periods. Despite the worldwide importance of research funding and peer review processes, there is little evidence on the personal costs on researchers to prepare funding proposals.

Personal costs could possibly be reduced by streamlining application processes. Some funding agencies have made changes to reduce the burden on applicants and their peer review systems. The US National Institute of Health (NIH) shortened their applications to benefit the peer reviewers and administration [1], and consequently reduced the burden on applicants. The UK Engineering and Physical Sciences Research Council (EPSRC) trialled strict submission rules for previously unsuccessful applicants to reduce the peer review workload, but this change was met by strong protests from researchers [2]. The Canadian Institutes of Health Research reviewed their funding schemes specifically to reduce applicant workload [3], but they did not investigate other areas of personal burden. The RAND Corporation (Europe) has recognised the burden on applicants during the development and refinement of a proposal [4]. The 2012 McKeon review into Australian research funding recommended the streamlining of grant proposals to minimise the burden on applicants [5]. These changes are a clear acknowledgement of the workload and other impacts of applying for research funding. However, as yet these impacts on applicants have not been examined.

In 2012, Australian researchers spent an estimated 550 years preparing 3,727 proposals for the National Health and Medical Research Council (NHMRC) Project Grant funding round, at an estimated annual salary cost of AU\$66 million [6, 7]. These figures underestimate the total cost because they do not include administrative or technical support, peer review, and do not include the personal costs and impacts on family and relationships. The NHMRC funding cycle [8] differs from comparable international funding schemes where multiple or sliding window submissions are commonplace, e.g., Canada [3], UK [9, 10] and USA [11, 12] (Box 1). The impact of this single submission deadline has not previously been examined.

This study sets out to ‘ask the researcher’ about their experience as applicants when preparing funding proposals for a single annual funding deadline, and the consequences for their work and home lives.

Methods

Study design

The NHMRC Project Grant is the main scheme for funding health and medical research in Australia and has a single annual deadline for submission. In March 2013, Australian researchers submitted 3,916 proposals to the NHMRC Project Grant funding scheme. In May 2013, email invitations to participate in a web-based survey were distributed to the research community through existing networks from previous studies [6]. Researchers responded from May to July 2013 and took 10–20 minutes to complete the survey depending on how many additional comments they provided. This study was approved by the Queensland University of Technology Ethics Committee (1300000210).

Survey questions

The survey questions were developed to ‘ask the researcher’ about their experience of applying for NHMRC Project Grants. To gauge the representativeness of our sample we asked for geographical locations (major city, inner regional, outer regional or remote) [13], academic level (early-career (Level A) to Professor (Level E)) and whether the researcher’s university belonged to one of eight research intensive universities known as the Group of Eight (Go8, www.go8.edu.au). All Go8 universities are located in major cities and in 2012 they received 63% of all NHMRC funding (AU\$408 million) [8].

As indicators of experience with writing proposals and prior success, researchers were asked for the number of NHMRC Project Grants they currently held as a Chief Investigator (CI), and the number of proposals submitted in March 2013. CIs can hold a maximum of six Project Grants at one time. The characteristics of the researchers and those providing comments are compared in Table 1. The survey included separate sections on personal workloads and motivations to submit proposals. Researchers were asked to rate their agreement (strongly agree to strongly disagree) with the statements in Table 2. For presentation purposes we summarised the responses into agree or disagree. A free-text option was provided for personal workloads after the open-ended prompt: “Please tell us more about the impact of grant writing season on your work and personal life”.

Qualitative analysis

From 239 survey respondents, 24 were excluded from the analysis due to: only answering the initial one or two survey questions and having missing data for the majority (n=10); not holding an academic position (n=12); or being a PhD student (n=2). The analysis focussed on the 215 researchers who currently held academic positions (n=200, providing 122 comments)

or maintained anonymity by not providing academic level (n=15, five comments). From the free-text comments for personal workloads, factors relating to researchers' experience of preparing their proposals were identified and explored using thematic analysis. All comments were categorised by academic level and location of primary institution.

The broad themes within each category were examined by DH and AGB prior to a secondary thematic analysis by JC (an experienced qualitative researcher). Excerpts were sorted into initial groupings by DH. These excerpts revealed the themes relating to the impacts on work–life and home–life. DH, JC and AGB reviewed these themes and agreed on the coding framework. All comments were then coded by DH according to the identified themes using NVivo 9 (QSR International Pty Ltd., 2010). JC reviewed the coding in detail and any minor discrepancies were resolved. Through the analytic process, and the building up of the coding framework, the themes common to each academic level, and Go8 versus non-Go8 universities, were identified. The research team developed the interpretations of these themes with in-depth discussion to reach a consensus for the analysis.

Results

Among 215 researchers, academic level ranged from early career (Level A and B) to senior levels (Level D and E), and almost all were at institutions in major cities (88%). More than half the researchers were currently recipients of NHMRC Project Grants as Chief Investigators, and most had submitted proposals in the 2013 funding round. Almost all researchers supported changes to the current NHMRC processes to prepare and submit proposals (71% major; 24% minor) and peer-review (60% major; 30% minor). More than half of the researchers (59%) provided extensive comments on the ongoing personal impact of concurrent grant-writing and holiday seasons on their work–life and home–life. The

characteristics of those providing comments (n=127) were similar to the complete sample (Table 1).

Researchers agreed preparing their grant proposals always took top priority over other work (97%) and personal (87%) commitments (Table 2). Almost all researchers agreed that they became stressed by the workload (93%) and restricted their holidays during the grant writing season (88%). Most researchers agreed there were other motivations to submit proposals, including: the element of chance in being successful (75%), as performance requirements at their institution (60%) or because of pressure from their colleagues (53%).

A small number of researchers disagreed and reported preparing their grant proposals did not take over their work (3%) and they did not become stressed (7%). These researchers provided comments on planning ahead and starting early on their proposals. They acknowledged the system was designed to be tough and reported “those academics who can’t handle it shouldn’t hold NHMRC grants.”

Thematic analysis of work–life

Six major themes are identified for each of work–life and home–life (Box 2). These themes are described below in descending order of frequency, along with a number of indicative quotes. The quotes have been minimally edited for readability while preserving the meaning; the location of primary institution and academic level of the researcher are in parenthesis.

For work–life, the six major themes are: 1) top priority, 2) career progression, 3) stress, 4) benefits, 5) time spent at work, and 6) pressure from or onto colleagues.

Work–life theme 1: Top priority

Preparing and submitting grant proposals were given top priority over all other work commitments. Gaining funding was important to continue research and maintain staff however it came at the cost of stopping current research from progressing.

“Without successful grants there is no money for work, no salary and hence no living.”

(Major city Go8, Level B, ID6)

“I feel like my life is on hold for the 1st 2–3 months of the year and that my real work i.e. doing the research and writing papers suffers as a consequence.” (Major city Go8, Level D, ID30)

Work–life theme 2: Career progression

The success or failure of researchers to gain funding has direct impact on their career. Successfully gaining funding was rewarded by future promotion and is the key indicator of being a competitive researcher on the international stage.

“If I don’t get a grant, I will never be promoted!” (Major city Not Go8, Level C, ID59)

Increasing time spent preparing proposals may be seen as an indicator of being uncompetitive or disorganised.

“The people who complain about lack of time are those who are unorganised or who have poor ideas/preliminary data for grants.” (Major city Not Go8, Level B, ID98)

However, researchers with a competing teaching load need to juggle these competing demands beyond simply being organised or starting early.

“Most academics have other commitments, teaching and supervision, occasionally even actually doing research, which takes up a large amount of time at other times of year.” (Major city Not Go8, Level C, ID36)

Work-life theme 3: Stress

Researchers are under considerable stress while preparing their proposals and waiting for peer review reports.

“The NHMRC grant system is the single worst aspect of my job as a research academic.”

(Regional, Level D, ID149)

“The stress is largely induced by knowing that the chance of anyone with even a modicum of expertise in your field reviewing your grant is basically zero.” (Major city Go8, Level C, ID24)

Additional pressure is placed on researchers as they acknowledge their low chance of success and question the likelihood of ongoing employment.

“It is very stressful to spend a lot of time and effort writing a proposal that has a very low chance of success... Many people anxiously await the grant outcome to see if they are out of work in six weeks.” (Major city Not Go8, Level D, ID125)

Work-life theme 4: Benefits

The benefits of applying for funding were divided into personal benefits (positive) and competitive benefits for peer reviewers (negative). Some researchers acknowledged the personal benefits of writing their proposals as their team brainstormed and refined new scientific ideas.

“I do it because our teams do have real sparks that happen during the proposal process which leads to new ideas and new directions.” (Major city Not Go8, Level D, ID68)

Other senior researchers reported on the gaming of the peer review process.

“It rewards people who know how to 'play the system' rather than the value of the science... there are a lot of people within the system who 'look after each other'. You review for me and I'll review for you.” (Major city Not Go8, Level E, ID23)

Work–life theme 5: Time spent at work

As the priority at work is to prepare grant proposals, the time spent on other work spreads beyond the standard working day. Researchers work at nights and on weekends, especially those with concurrent teaching roles.

“Late nights, neglect staff and students, mental exhaustion, intense frustration with RGMS [the online application system].” (Major city Go8, Level E, ID22)

Work–life theme 6: Pressure from or onto colleagues

Some researchers feel pressure from their colleagues to submit proposals to meet the requirements of their institution.

“University pressure to submit NHMRC grants because [they are] valued above all else.” (Major city Not Go8, Level E, ID14)

The pressure to submit proposals limits the time available to publish which would, in turn, improve the likelihood of being funded.

“Grant writing severely impacts on getting papers written...[and] impacts on [my] track record, making it less likely that grants applied for will be funded.” (Major city Go8, Level C, ID143)

For senior researchers their involvement in funding proposals includes the internal review and administration of other proposals; often to the exclusion of contact with their collaborators, junior researchers or students.

Thematic analysis of home–life

For home-life, the six major themes were: 1) family holidays and conflicting timing; 2) time spent on work at home; 3) impact on children; 4) stress at home; 5) impact on family, partner and friends; and 6) direct impact on partner.

Home-life theme 1: Family holidays and conflicting timing

The conflict between the single annual funding deadline and spending holidays with children and family is a recurring issue for researchers with family responsibilities. Most university research offices require the application up to five weeks before the deadline so that most researchers work on the application over the Australian summer when the community takes extended Christmas holidays. The summer holiday season is also the longest school holiday period (6-8 weeks) in Australia and many researchers express their frustration and guilt at not spending more time with their children and families.

“The process is too involved with a very low success rate, and is poorly timed over Christmas holidays! This year I opted out of applying to improve my family.” (Major city Go8, Level C, ID27)

“My family chose to go away without me, or not to go away at Christmas time.” (Major city Go8, Level D, ID28)

Other researchers report the absence of university support during grant writing season when administrative staff are on their summer holidays.

“Just when most academics are due for a break, right when most universities shut down and take offline all of their support services, RGMS [online application process] opens up.” (Major city Not Go8, Level D, ID20)

Home-life theme 2: Time spent on work at home

For most researchers the only solution to managing their workload is to work at home in the evenings and on weekends; even while on holidays or recovering from health issues.

“My life is completely dominated by the need to get the grant applications completed on time - I almost can't think of anything else for 2–3 months!” (Major city Not Go8, Level C, ID40)

“I have sacrificed personal time, holidays, many social and work commitments, sleep, exercise and much more to devote months to writing grants.” (Major city Not Go8, Level E, ID91)

Some researchers questioned why they continue in a research career with such uncertainty and significant negative impacts on their health.

“It makes me ill. I have developed migraine phenotypes for the first time in my life whilst writing grants.” (Major city Go8, Level D, ID87)

“This year was particularly bad and by the end of it I was an emotional wreck.” (Major city Go8, Level C, ID159)

Home-life theme 3: Impact on children

Researchers with responsibilities for children, especially young children, express their frustration and guilt as they “neglected” their children to give top priority to their grant writing.

“I have a young family and our lives are put on hold for 3 months at the worst possible time of year. We have to pay for childcare so there is a huge financial cost plus the personal cost of not being with my children.” (Major city Go8, Level B, ID19)

“My husband and I are both researchers funded by the NHMRC and we have two young children. We are finding this time incredibly stressful and often feel as if our children are

being disadvantaged through lack of quality parenting time.” (Major city Go8, Level C, ID51)

Many researchers are appalled at the lack of family friendly policies around the timing for Australian funding schemes.

“What should be the happiest time of the year (kids on holiday, summer, Christmas) is now the most stressful because of the perfect storm of ARC & NHMRC grant deadlines and teaching commitments for the new year.” (Major city Not Go8, Level C, ID101)

An early career researcher reported on the guilt felt from being absent for important events in their child’s life while preparing their proposal:

“You will always have mother's guilt, now I have grant writing guilt!” (Major city Go8, Level A, ID55)

Home-life theme 4: Stress at home

The stress on researchers during preparation of their proposals over-flows into their personal lives and family relationships. Researchers are stressed and leading unhealthy lifestyles during grant-writing season and the rest of the household is negatively impacted.

“Negative impact on sleep and health, family life, school holiday period; on domestic chores, cleanliness, tidiness and healthy eating at home... makes me angry!” (Major city Go8, ID34)

“This also had flow on effects for family life... [a] tired and cranky, stressed family member (me) was very disruptive to family life.” (Major city Not Go8, Level A, ID69)

The low chance of success further adds to the stress as researchers consider the impact of unsuccessful proposals on their continuing employment and providing for their family.

“I feel depressed by the fact that grants that received very good [peer review] comments got culled, [and] not even being ranked.” (Major city Go8, Level B, ID117)

Home-life theme 5: Impact on family, partner and friends

The grant writing season directly impacts on researchers’ personal relationships and carer responsibilities for children and ageing parents. The “annual problem” of grant season is an ongoing issue for personal relationships that must either adapt to the seasonal restrictions or be sidelined.

“My family hates my profession. Not just my partner and children, but my parents and siblings. The insecurity despite the crushing hours is a soul destroying combination that is not sustainable.” (Major city Go8, Level B, ID19)

“Only the strongest relationships survive ... I focus on only the closest family members [for] maintaining relationships. Other relationships have had to adapt to the annual problem or, more often, disintegrate.” (Major city Go8, Level D, ID26)

Home-life theme 6: Direct impact on partner

In addition to comments on family and friends that include their partner, some researchers specifically report the impact on their partner. Having a supportive partner is crucial for some researchers to have sufficient time to prepare their proposals.

“I limit family holidays, spend less time with my young children (particularly during their summer school holidays) and I get almost no other research work done for 3 months. This is only possible because my partner is very understanding.” (Major city Go8, Level E, ID108)

“My spouse had to take over a lot of my responsibilities at home... due to the instability of a research job, he is the main breadwinner at home, and [he also] has a very stressful, demanding job.” (Major city Not Go8, Level B, ID36)

Mental health and well-being

Additional impacts on mental health and well-being were identified through comments including: “incredible anxiety”, “depressed”, “despondent”, “insecurity”, and “soul-destroying”. The mental health and welfare of researchers warrants further examination beyond this study.

Discussion

Workload, stress and family

The current study provides the first empirical evidence of the personal experience of Australian researchers as applicants for funding. It provides strong indications of worker stress and burnout. Anecdotal stories of the impact of grant writing are common in conversations among researchers, especially those with young children [14]. The findings from our study provide the empirical evidence that grant writing has significant negative impact on researchers’ health and well-being.

Our findings showed some researchers were willing to accept the workload to prepare grant proposals. Others felt there was little choice but to accept the tough reality of seeking research funding in Australia. Academic career progression and continuing employment depends strongly on successfully obtaining funding, and this was accepted as the status quo for research careers. Another reason motivating researchers to submit grant proposals was that institutions expect their researchers to apply for funding regardless of their likely chance of success. There is a general atmosphere of pressure from colleagues to submit proposals. As a consequence, the time demands required to prepare proposals can move the pressure of other workloads onto colleagues.

Strengths and limitations

This is the first Australian study providing empirical evidence of the significant negative impact of applying for funding on researchers’ productivity, health and well-being. It also provides first-time evidence of impact on home and family life due to the grant writing season for the major Australian funding source for health and medical research. Further, it highlights the problems in Australia arising from preparing proposals for a single annual funding deadline.

Researchers responding to the survey may not be representative of the complete population of researchers. However, our sample did report a history of successfully gaining funding from NHMRC Project Grants. Researchers from early-career (Level A) to Professor (Level E) provided comments on their personal lives so the difficulties were not just confined to new academics who may not know how to work the system or are disorganised. A larger sample of researchers from major cities is unlikely to alter the findings from the qualitative analysis. Researchers from regional areas were a minority and a larger sample may provide for comparisons between researchers in regional areas or major cities. The costs to the mental health and well-being of the researcher or their family members could not be quantified in this study and requires further examination.

Funding deadlines

A single annual deadline places enormous pressure on Australian researchers to prepare their proposals. Changing the timing of the annual funding scheme, or following international schemes with multiple rounds per year, will have wide-ranging benefits for Australian researchers especially those with children [14]. Successfully gaining annual funding is one of

the most important tasks researchers need to achieve. Sometimes researchers feel pressure to apply for inappropriate reasons or before they have a competitive track record. Researchers go to extraordinary lengths to prepare good proposals, often sacrificing family time and personal relationships. Much of the stress comes from having a heavily bureaucratic process that demands a lot of work and data from researchers for a single annual deadline. The grant writing season may *only* last over three summer months however researchers place enormous importance on this time because the consequences are a delay of one year before the next opportunity to apply.

Work–home conflict

The impact of funding schemes on workplace stress in an academic environment has been examined. A survey of over 1,100 US research administrators from 2007 to 2010 found almost 90% of administrators had increasing work demands and stress, with increasing impact on their family responsibilities [15]. This study was set in an academic environment but the workplace stress of US academics was not specifically examined. More than a decade of research has been conducted on the impact of having children on the careers of tenure-track US academics [16]. Equivalent tenure-track positions do not exist for Australian academic researchers therefore the need to secure research funding is imperative for continuing employment to provide for their families.

The personal cost and stress of being an Australian academic has been investigated. The National University Stress Study compared two surveys (2000 and 2003/4) of 447 academics and found increasing work pressure predicted increasing work–home conflict and psychological strain [17]. Another survey from 2004 to 2008 showed Australian academics were less satisfied with their work–home balance compared with employees in other

1
2
3 industries [18, 19]. Advances in technology have added to the personal workloads of all
4
5 Australians creating time poverty and household stress [20]. The mobility provided by a
6
7 laptop and home internet connection facilitates the work–home conflict as researchers can
8
9 continue their research and grant writing at almost any time. Further, researchers under
10
11 pressure to manage their workload may find it difficult to resist confining work to normalised
12
13 hours.
14

15
16
17
18 The negative impacts of grant writing on personal and family life are usually anecdotal or
19
20 hidden in the grey literature [14, 21], and go unreported in publications on academic work
21
22 life. Other research focuses on the burden on peer reviewers and administrators and not the
23
24 applicants [22]. Innovative policies from funding agencies can reduce the burden on
25
26 applicants and facilitate the reduction in personal workloads on researchers and be more
27
28 family friendly. The personal impact of unsuccessful proposals with a lack of feedback on the
29
30 reasons for failure may be adding to the negative experiences of researchers as applicants.
31
32 Anecdotally, some researchers have been depressed and despondent about trying again in the
33
34 next funding round. The level of mental health and mood disorders of researchers during the
35
36 funding rounds needs to be explored.
37
38
39

40
41
42
43 **Conclusion**

44
45 A single annual deadline for major funding schemes adds extra pressure on researchers. The
46
47 timing of the annual deadline could be shifted away from the longest school holidays, and
48
49 proposals could be streamlined, to minimise the applicant burden; especially for researchers
50
51 who are parents. As demonstrated by international funding agencies, having more than a
52
53 single annual deadline would distribute the funding opportunities across the year; researchers
54
55 would have more time to work on active research and be with their families.
56
57
58
59
60

Acknowledgements The authors are grateful to the Australian researchers who provided the survey data. The sole role of the NHMRC in this project is as the research funder.

Contributors DH, PC, NG and AGB conceived and designed the study. DH and AGB analysed the descriptive data. DH and JC analysed the qualitative data. All authors interpreted the data, drafted the article or revised it critically for important intellectual content and approved the version to be published. AGB is the study chief investigator and guarantor.

Funding This work was funded by the National Health and Medical Research Council (NHMRC Project Grant number 1023735).

Competing interest declaration All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare their academic, non-financial interests that may be relevant to the funding of research. DLH salary is supported from NHMRC funding. JC receives funding from NHMRC, ARC and several other state funding agencies. PC receives funding from NHMRC, NIH and several other national and international health funding agencies. NG receives funding from NHMRC, ARC, NIHR, QLD Government and is the academic director of the Australian Centre for Health Services Innovation. AGB receives funding from NHMRC and QLD Government.

Ethics approval Queensland University of Technology Ethics Committee (1300000210).

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement All the data collected as part of this study are available to interested researchers through ethical approval from the QUT Human Research Ethics Committee. Please contact Adrian Barnett (a.barnett@qut.edu.au) if you are interested in accessing the data.

Transparency declaration DH and AGB affirm that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study

have been omitted; and that any discrepancies from the study as planned have been explained.

References

1. Bonetta L. Enhancing NIH grant peer review: a broader perspective. *Cell* 2008; 135(2): 201-204.
2. Van Noorden R, Brumfiel G. Fixing a grant system in crisis. *Nature* 2010; 464(7288): 474-475.
3. Canadian Institutes of Health Research. *Designing for the future: the new Open Suite of Programs and peer review process*. CIHR: Ontario. 2013.
www.cihr-irsc.gc.ca/e/documents/or_des_for_future-en.pdf
4. Guthrie S, Guerin B, Wu H, Ismail S, Wooding S. *Alternatives to peer review in research project funding*. RAND Corporation (Europe). 2013.
www.rand.org/pubs/research_reports/RR139.html
5. Australian Government. *Strategic review of health and medical research in Australia: better health through research*. Department of Health and Ageing: Canberra. 2013.
www.mckeeonreview.org.au
6. Herbert DL, Barnett AG, Clarke P, Graves N. On the time spent preparing grant proposals: an observational study of Australian researchers. *BMJ Open* 2013; 3(5): e002800.
7. Herbert DL, Barnett AG, Graves N. Funding: Australia's grant system wastes time. *Nature* 2013; 495(7441): 314.
8. National Health and Medical Research Council. *Research funding facts book 2012*. NHMRC: Canberra. 2013.
www.nhmrc.gov.au/_files_nhmrc/publications/attachments/nh161_nhmrc_funding_facts_book_130809.pdf

9. Engineering and Physical Sciences Research Council. *Funding guide. Arrangements and procedures for research grants and research fellowships*. EPSRC: Swindon. 2013. www.epsrc.ac.uk/SiteCollectionDocuments/FundingGuide.pdf
10. Medical Research Council. *Handbook for applicants and grant holders*. MRC: London. www.mrc.ac.uk/Fundingopportunities
11. National Institutes of Health. *SF424 (R&R) application guide for NIH and other PHS agencies*. NIH: USA. 2013. grants.nih.gov/Grants/funding/424/SF424_RR_Guide_General_Adobe_VerB.pdf
12. National Science Foundation. Grant proposal guide. NSF: USA. 2011. p I-3. www.nsf.gov/pubs/policydocs/pappguide/nsf11001/gpgprint.pdf
13. Australian Bureau of Statistics. *Australia Remoteness Area, Australian Standard Geographical Classification (ASGC)*. ABS: Canberra. 2006. www.abs.gov.au/AUSSTATS
14. Jacobson K. Six steps to fairer funding for female scientists. *The Conversation* 24 October 2013. <http://theconversation.com/six-steps-to-fairer-funding-for-female-scientists-16895>
15. Shambrook JP. Comparison of stress-related factors in the 2007 and 2010 Research Administrator Stress Perception Surveys (RASPerS). *Journal of Research Administration* 2012; 43(2): 107-118.
16. Mason MA, Wolfinger NH, Goulden M. Alone in the ivory tower. *Do babies matter? Gender and family in the ivory tower* Rutgers University Press: New Jersey. 2013. Ch. 4: 59-82. http://rutgerspress.rutgers.edu/product/Do-Babies-Matter_4767.aspx
17. Winefield T, Boyd C, Saebel J, Pignata S. Update on National University Stress Study. *Australian Universities' Review* 2008; 50(1): 20-29.

1
2
3 18. Langford PH. Benchmarking work practices and outcomes in Australian universities
4 using an employee survey. *Journal of Higher Education Policy & Management* 2010;
5 32(1): 41-53.
6
7
8
9
10 19. Bentley PJ, Coates H, Dobson IR, Goedegebuure L, Meek VL. *Factors associated*
11 *with job satisfaction amongst australian university academics and future workforce*
12 *implications*. Job Satisfaction around the Academic World. Springer: Dordrecht.
13 2012. p29-54.
14
15
16
17
18 20. Pocock B, Skinner N, Williams P. *Time bomb: work, rest and play in Australia today*.
19 2012. NewSouth Publishing: Sydney.
20
21
22
23 21. Decker RS, Wimsatt L, Trice AG, Konstan JA. *A profile of federal-grant*
24 *administrative burden among Federal Demonstration Partnership faculty*. Faculty
25 Standing Committee of the Federal Demonstration Partnership: USA. 2007.
26 http://www.iscintelligence.com/archivos_subidos/usfacultyburden_5.pdf
27
28
29
30
31
32 22. Demicheli V, Di Pietrantonj C. Peer review for improving the quality of grant
33 applications. *Cochrane Database Of Systematic Reviews (Online)* 2007; April 18 (2):
34 MR000003.
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Box 1 International comparison of submission deadlines			
Country	Funding Agency	Funding Scheme	Annual Submissions (Month)
Australia	National Health & Medical Research Council, NHMRC	Project Grant	One (Mar)
Canada	Canadian Institute of Health Research, CIHR	Open Suite of Programs	Two (Mar, Sep)
UK	Engineering and Physical Science Research Council, EPSRC	Standard Grant	Ongoing
UK	Medical Research Council, MRC	Research Grant	Three (Jan, May, Sep)
USA	National Institutes of Health, NIH	RO1 Research Grant	Three (Feb, Jun, Oct)
USA	National Science Foundation, NSF	Program Grant	Ongoing

Box 2 Impact of single annual funding deadline on work–life and home–life	
Work– life themes	Home–life themes
1) Top priority	1) Family holidays and conflicting timing
2) Career progression	2) Time spent on work at home
3) Stress	3) Impact on children
4) Benefits	4) Stress at home
5) Time spent at work	5) Impact on family, partner and friends
6) Pressure from colleagues	6) Direct impact on partner

Table 1 Characteristics of all researchers and those providing comments

Characteristic	All researchers n=215	Researchers providing comments n=127
Current academic level (example role)	%	%
Level A (Assistant Lecturer)	7	8
Level B (Lecturer)	19	20
Level C (Senior Lecturer)	27	27
Level D (Associate Professor)	15	20
Level E (Professor)	24	21
Prefer not to answer	1	1
Missing	7	4
Location of primary institution		
Major city, Group of Eight (Go8) ^a	51	54
Major city, Not Go8	37	36
Regional	4	6
Prefer not to answer	1	2
Missing	7	4
Chief Investigator (CI) role ^b		
Grants currently held		
None	32	35
1–2	43	44
3–4	9	10
5–6	4	6
Missing	13	5
Proposals submitted in latest round		
None	15	11
1–2	49	57
3–4	22	24
5–6	2	2
Missing	12	5

Percentages may not add to 100% due to rounding.
^a Research intensive university part of the Group of Eight (Go8).
^b NHMRC Project Grant funding rules stipulate a maximum of six grants per CI.

Table 2 Impact of grant writing on Australian researchers, by location of primary institution

		All researchers, n=215	
Personal workloads	Row %	Agree	Disagree
I give top priority to writing my proposals over my other work commitments			
Major city, Group of Eight (Go8) ^a		98	2
Major city, Not Go8		95	5
Regional		100	0
I give top priority to writing my proposals over my personal commitments			
Major city, Go8		90	10
Major city, Not Go8		83	17
Regional		89	11
I get stressed by the workload required to write my proposals			
Major city, Go8		92	8
Major city, Not Go8		95	5
Regional		89	11
I restrict any holidays with my family and friends to focus on writing my proposals			
Major city, Go8		90	10
Major city, Not Go8		86	14
Regional		89	11
Motivation to submit proposals			
I submit proposals each year because chance is involved in being funded			
Major city, Go8		75	25
Major city, Not Go8		72	28
Regional		89	11
I submit proposals to meet the academic performance requirements of my institution			
Major city, Go8		60	41
Major city, Not Go8		57	44
Regional		78	22
I feel pressure from my colleagues to submit proposals			
Major city, Go8		53	47
Major city, Not Go8		48	51
Regional		78	22

Missing data not shown. Row percentage may not add to 100 due to rounding.

^a One of eight research intensive universities known as the Group of Eight (Go8).

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Done
Title and abstract	1	(a) Indicate the study’s design with a commonly used term in the title or the abstract	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Yes
Objectives	3	State specific objectives, including any prespecified hypotheses	Yes
Methods			
Study design	4	Present key elements of study design early in the paper	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes
Participants	6	(a) Cohort study—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	N/A
		Case-control study—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls	N/A
		Cross-sectional study—Give the eligibility criteria, and the sources and methods of selection of participants	Yes
		(b) Cohort study—For matched studies, give matching criteria and number of exposed and unexposed	N/A
		Case-control study—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Yes
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Yes
Bias	9	Describe any efforts to address potential sources of bias	Yes
Study size	10	Explain how the study size was arrived at	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	N/A
		(b) Describe any methods used to examine subgroups and interactions	Yes
		(c) Explain how missing data were addressed	Yes
		(d) Cohort study—If applicable, explain how loss to follow-up was addressed	N/A
		Case-control study—If applicable, explain how matching of cases and controls was addressed	N/A
Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy	Yes		
		(e) Describe any sensitivity analyses	N/A

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Yes
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Yes
		(b) Indicate number of participants with missing data for each variable of interest	Yes
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	N/A
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	N/A
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	N/A
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Yes
Discussion			
Key results	18	Summarise key results with reference to study objectives	N/A
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	N/A
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	N/A
Generalisability	21	Discuss the generalisability (external validity) of the study results	N/A
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.



**The impact of funding deadlines on personal workloads,
stress and family relationships: a qualitative study of
Australian researchers**

Journal:	<i>BMJ Open</i>
Manuscript ID:	bmjopen-2013-004462.R1
Article Type:	Research
Date Submitted by the Author:	18-Feb-2014
Complete List of Authors:	Herbert, Danielle; Queensland University of Technology, Institute of Health and Biomedical Innovation Coveney, John; Flinders University, School of Medicine Clarke, Philip; The University of Melbourne, Melbourne School of Population and Global Health Graves, Nicholas; Queensland University of Technology Barnett, Adrian; Queensland University of Technology
Primary Subject Heading:	Public health
Secondary Subject Heading:	Qualitative research
Keywords:	PUBLIC HEALTH, QUALITATIVE RESEARCH, MENTAL HEALTH, MEDICAL EDUCATION & TRAINING

SCHOLARONE™
Manuscripts

Title The impact of funding deadlines on personal workloads, stress and family relationships:
a qualitative study of Australian researchers

Authors Danielle L Herbert, John Coveney, Philip Clarke, Nicholas Graves, Adrian G
Barnett

Address for each author DLH, NG, AGB: School of Public Health and Social Work &
Institute of Health and Biomedical Innovation, Queensland University of Technology, 60
Musk Ave, Kelvin Grove, Brisbane, Queensland 4059, Australia.

DLH: Postdoctoral Research Fellow. NG: Professor of Health Economics. AGB: Principal
Research Fellow.

JC: School of Medicine, Flinders University, GPO Box 2100, Adelaide, South Australia
5001, Australia.

JC: Professor of Public Health.

PC: Melbourne School of Population and Global Health, The University of Melbourne, 207-
221 Bouverie St, Parkville, Melbourne, Victoria 3010, Australia.

PC: Professor of Health Economics.

Corresponding author

DLH: Danielle L Herbert Email: d2.herbert@qut.edu.au

Abstract word count: 282

Manuscript word count: 4359

Abstract

Objective To examine the impact of applying for funding on personal workloads, stress and family relationships.

Design Qualitative study of researchers preparing grant proposals.

Setting Web-based survey on applying for the annual National Health and Medical Research Council (NHMRC) Project Grant scheme.

Participants Australian researchers (n=215).

Results Almost all agreed preparing their proposals always took top priority over other work (97%) and personal (87%) commitments. Almost all researchers agreed that they became stressed by the workload (93%) and restricted their holidays during the grant writing season (88%). Most researchers agreed that they submitted proposals because chance is involved in being successful (75%), due to performance requirements at their institution (60%), and pressure from their colleagues to submit proposals (53%). Almost all researchers supported changes to the current processes to submit proposals (95%) and peer-review (90%). Most researchers (59%) provided extensive comments on the impact of writing proposals on their work–life and home–life. Six major work–life themes were: 1) top priority; 2) career development; 3) stress at work; 4) benefits at work; 5) time spent at work; and 6) pressure from colleagues. Six major home–life themes were: 1) restricting family holidays; 2) time spent on work at home; 3) impact on children; 4) stress at home; 5) impact on family and friends; and 6) impact on partner. Additional impacts on the mental health and well-being of researchers were identified.

Conclusions The process of preparing grant proposals for a single annual deadline is stressful, time consuming and conflicts with family responsibilities. The timing of the funding cycle could be shifted to minimise applicant burden, give Australian researchers more time to work on actual research and to be with their families.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Strengths and limitations

- This is the first Australian study providing empirical evidence of the significant negative impact of applying for a single annual funding deadline on researchers’ productivity, health and well-being.
- This study found the process of preparing grant proposals is stressful, time consuming and conflicts with responsibilities for children and family.
- Researchers responding to the survey may not be representative of the complete population of researchers however they did report a history of successfully gaining funding.
- The costs to the mental health and well-being of the researcher or their family members could not be quantified in this study and requires further examination.

Introduction

Large amounts of time are invested by academics preparing funding proposals to support their research. A successful proposal provides an obvious pay-off but the costs could be felt personally with stress placed on private lives during grant writing seasons, and subsequent rebuttal periods. Despite the worldwide importance of research funding and peer review processes, there is little evidence on the personal costs on researchers to prepare funding proposals.

Personal costs could possibly be reduced by streamlining application processes. Some funding agencies have made changes to reduce the burden on applicants and their peer review systems. The US National Institute of Health (NIH) shortened their applications with the intention to reduce the burden on the administration, peer reviewers and applicants [1]. The UK Engineering and Physical Sciences Research Council trialled strict submission rules for previously unsuccessful applicants to reduce the peer review workload, but this change was met by strong protests from researchers [2]. The Canadian Institutes of Health Research reviewed their funding schemes specifically to reduce applicant workload [3], but they did not investigate other areas of personal burden. The RAND Corporation (Europe) has recognised the burden on applicants during the development and refinement of a proposal [4]. The 2012 McKeon review into Australian research funding recommended the streamlining of grant proposals to minimise the burden on applicants [5]. These changes are a clear acknowledgement of the workload and other impacts of applying for research funding. However, as yet these impacts on applicants have not been examined.

In 2012, Australian researchers spent an estimated 550 years preparing 3,727 proposals (21% were funded) for the major National Health and Medical Research Council (NHMRC) funding scheme, at an estimated annual salary cost of AU\$66 million [6, 7]. These figures underestimate the total cost because they do not include administrative or technical support, peer review, and do not include the personal costs and impacts on family and relationships.

Alberts (2010) stated the reliance in the US on NIH funding to expand research capacity is unsustainable when the success rates can be below 10% [8]. The pattern is similar in Australia as the number of proposals submitted to the NHMRC is rising steadily and the success rate declined to 17% in 2013 [9, 10]. If this pattern continues the prediction is that more than 5000 proposals may be submitted to the major NHMRC funding scheme in 2017 [11]. International agencies have implemented initiatives to reduce the total number of proposals being submitted by barring unsuccessful proposals from previous years [2, 11].

The European Science Foundation makes the distinction between funding schemes that are either ‘managed’ by setting timelines and deadlines for each funding cycle, or are ‘responsive’ to the receipt of proposals for funding cycles that are continuously open [12]. The NHMRC major funding scheme is ‘managed’ for a single deadline [9] and differs from comparable international funding schemes where multiple deadlines are available or schemes are continuously open, e.g., Canada [3], UK [13, 14] and USA [15, 16] (Box 1). Funding schemes are expected to be efficient, fair and rational [17], however the impact of a single submission deadline has not previously been examined.

This study sets out to ask the researcher about their experience as applicants when preparing funding proposals for a single annual funding deadline, and the consequences for their work and home lives.

Methods

Study design

The NHMRC Project Grant is the main scheme for funding health and medical research in Australia and has a single annual deadline for submission. In March 2013, Australian researchers submitted 3,916 proposals to the NHMRC Project Grant funding scheme, and 17% were funded. In May 2013, email invitations to participate in a web-based survey were distributed to the research community through existing networks from previous studies [6]. The target group was researchers with the experience of applying for a NHMRC Project Grant either in 2013 or previous funding rounds. Researchers responded from May to July 2013 and took 10–20 minutes to complete the survey depending on how many additional comments they provided. This study was approved by the Queensland University of Technology Ethics Committee (1300000210).

Survey questions

The survey questions were developed to ask the researcher about their experience of applying for NHMRC Project Grants. To gauge the representativeness of our sample we asked for geographical locations (major city, inner regional, outer regional or remote) [18], academic level (early-career (Level A) to Professor (Level E)) and whether the researcher's university belonged to one of eight research intensive universities known as the Group of Eight (Go8,

www.go8.edu.au). All Go8 universities are located in major cities and in 2012 they received 63% of all NHMRC funding (AU\$408 million) [9].

As indicators of experience with writing proposals and prior success, researchers were asked for the number of NHMRC Project Grants they currently held as a Chief Investigator (CI), and the number of proposals submitted in March 2013. CIs can hold a maximum of six Project Grants at one time. The characteristics of the researchers and those providing comments are compared in Table 1. The survey included separate sections on personal workloads and motivations to submit proposals. Researchers were asked to rate their agreement (strongly agree to strongly disagree) with the statements in Table 2. For presentation purposes we summarised the responses into agree or disagree. A free-text option was provided for personal workloads after the open-ended prompt: “Please tell us more about the impact of grant writing season on your work and personal life”.

Qualitative analysis

From 239 survey respondents, 24 were excluded from the analysis due to: only answering the initial one or two survey questions and having missing data for the majority (n=10); not holding an academic position (n=12); or being a PhD student (n=2). The analysis focussed on the 215 researchers who currently held academic positions (n=200, providing 122 comments) or maintained anonymity by not providing academic level (n=15, five comments). From the free-text comments for personal workloads, factors relating to researchers’ experience of preparing their proposals were identified and explored using thematic analysis. All comments were categorised by academic level and location of primary institution.

The broad themes within each category were examined by DH and AGB prior to a secondary thematic analysis by JC (an experienced qualitative researcher). Excerpts were sorted into initial groupings by DH. These excerpts revealed the themes relating to the impacts on work–life and home–life. DH, JC and AGB reviewed these themes and agreed on the coding framework. All comments were then coded by DH according to the identified themes using NVivo 9 (QSR International Pty Ltd., 2010). JC reviewed the coding in detail and any minor discrepancies were resolved. Through the analytic process, and the building up of the coding framework, the themes common to each academic level, and Go8 versus non-Go8 universities, were identified. The research team developed the interpretations of these themes with in-depth discussion to reach a consensus for the analysis.

Results

Among 215 researchers, academic level ranged from early career (Level A and B) to senior levels (Level D and E), and almost all were at institutions in major cities (88%). More than half the researchers were currently recipients of NHMRC Project Grants as Chief Investigators, and most had submitted proposals in the 2013 funding round. Almost all researchers supported changes to the current NHMRC processes to prepare and submit proposals (71% major; 24% minor) and peer-review (60% major; 30% minor). More than half of the researchers (59%) provided extensive comments on the ongoing personal impact of concurrent grant-writing and holiday seasons on their work–life and home–life. The characteristics of those providing comments (n=127) were similar to the complete sample (Table 1).

1
2
3 Researchers agreed preparing their grant proposals always took top priority over other work
4 (97%) and personal (87%) commitments (Table 2). Almost all researchers agreed that they
5
6 became stressed by the workload (93%) and restricted their holidays during the grant writing
7
8 season (88%). Most researchers agreed there were other motivations to submit proposals,
9
10 including: the element of chance in being successful (75%), as performance requirements at
11
12 their institution (60%) or because of pressure from their colleagues (53%).
13
14
15
16
17

18
19 A small number of researchers disagreed and reported preparing their grant proposals did not
20
21 take over their work (3%) and they did not become stressed (7%). These researchers provided
22
23 comments on planning ahead and starting early on their proposals. They acknowledged the
24
25 system was designed to be tough and reported “those academics who can’t handle it shouldn’t
26
27 hold NHMRC grants.”
28
29
30
31

32 **Thematic analysis of work–life**

33
34 Six major themes are identified for the impact of applying for funding on each of work–life
35
36 and home–life (Box 2). These themes are described below in descending order of frequency,
37
38 along with a number of indicative quotes. The quotes have been minimally edited for
39
40 readability while preserving the meaning; the location of primary institution and academic
41
42 level of the researcher are in parenthesis.
43
44
45
46

47 For work–life, the six major themes are: 1) top priority; 2) career development; 3) stress at
48
49 work; 4) benefits at work; 5) time spent at work; and 6) pressure from colleagues.
50
51
52
53

54 **Work–life theme 1: Top priority**

Preparing and submitting grant proposals were given top priority over all other work commitments. Gaining funding was important to continue research and maintain staff however it came at the cost of stopping current research from progressing.

“Without successful grants there is no money for work, no salary and hence no living.”

(Major city Go8, Level B, ID6)

“I feel like my life is on hold for the 1st 2–3 months of the year and that my real work i.e. doing the research and writing papers suffers as a consequence.” (Major city Go8, Level D, ID30)

Work–life theme 2: Career development

The success or failure of researchers to gain funding has direct impact on their career. Successfully gaining funding was rewarded by future promotion and is the key indicator of being a competitive researcher on the international stage.

“If I don’t get a grant, I will never be promoted!” (Major city Not Go8, Level C, ID59)

Increasing time spent preparing proposals may be seen as an indicator of being uncompetitive or disorganised.

“The people who complain about lack of time are those who are unorganised or who have poor ideas/preliminary data for grants.” (Major city Not Go8, Level B, ID98)

However, researchers with a competing teaching load need to juggle these competing demands beyond simply being organised or starting early.

“Most academics have other commitments, teaching and supervision, occasionally even actually doing research, which takes up a large amount of time at other times of year.”

(Major city Not Go8, Level C, ID36)

Work–life theme 3: Stress at work

1
2
3 Researchers are under considerable stress while preparing their proposals and waiting for
4
5 peer review reports.
6

7 “The NHMRC grant system is the single worst aspect of my job as a research academic.”

8
9 (Regional, Level D, ID149)
10

11 “The stress is largely induced by knowing that the chance of anyone with even a
12
13 modicum of expertise in your field reviewing your grant is basically zero.” (Major city
14
15 Go8, Level C, ID24)
16
17

18 Additional pressure is placed on researchers as they acknowledge their low chance of success
19
20 and question the likelihood of ongoing employment.
21

22 “It is very stressful to spend a lot of time and effort writing a proposal that has a very low
23
24 chance of success... Many people anxiously await the grant outcome to see if they are
25
26 out of work in six weeks.” (Major city Not Go8, Level D, ID125)
27
28
29
30
31

32 **Work-life theme 4: Benefits at work**
33

34 The benefits of applying for funding were divided into personal benefits (positive) and
35
36 competitive benefits for peer reviewers (negative). Some researchers acknowledged the
37
38 personal benefits of writing their proposals as their team brainstormed and refined new
39
40 scientific ideas.
41

42 “I do it because our teams do have real sparks that happen during the proposal process
43
44 which leads to new ideas and new directions.” (Major city Not Go8, Level D, ID68)
45
46

47 Other senior researchers reported on the gaming of the peer review process.
48

49 “It rewards people who know how to 'play the system' rather than the value of the
50
51 science...there are a lot of people within the system who 'look after each other'. You
52
53 review for me and I'll review for you.” (Major city Not Go8, Level E, ID23)
54
55
56
57
58
59
60

Work-life theme 5: Time spent at work

As the priority at work is to prepare grant proposals, the time spent on other work spreads beyond the standard working day. Researchers work at nights and on weekends, especially those with concurrent teaching roles.

“Late nights, neglect staff and students, mental exhaustion, intense frustration with RGMS [the online application system].” (Major city Go8, Level E, ID22)

Work-life theme 6: Pressure from colleagues

Some researchers feel pressure from their colleagues to submit proposals to meet the requirements of their institution.

“University pressure to submit NHMRC grants because [they are] valued above all else.” (Major city Not Go8, Level E, ID14)

The pressure to submit proposals limits the time available to publish which would, in turn, improve the likelihood of being funded.

“Grant writing severely impacts on getting papers written...[and] impacts on [my] track record, making it less likely that grants applied for will be funded.” (Major city Go8, Level C, ID143)

For senior researchers their involvement in funding proposals includes the internal review and administration of other proposals; often to the exclusion of contact with their collaborators, junior researchers or students.

Thematic analysis of home-life

For home-life, the six major themes are: 1) restricting family holidays; 2) time spent on work at home; 3) impact on children; 4) stress at home; 5) impact on family and friends; and 6) impact on partner.

Home-life theme 1: Restricting family holidays

The conflict between the single annual funding deadline and spending holidays with children and family is a recurring issue for researchers with family responsibilities. Most university research offices require the application up to five weeks before the deadline so that most researchers work on the application over the Australian summer when the community takes extended Christmas holidays. The summer holiday season is also the longest school holiday period (6-8 weeks) in Australia and many researchers express their frustration and guilt at not spending more time with their children and families.

“The process is too involved with a very low success rate, and is poorly timed over Christmas holidays! This year I opted out of applying to improve my family.” (Major city Go8, Level C, ID27)

“My family chose to go away without me, or not to go away at Christmas time.” (Major city Go8, Level D, ID28)

Other researchers report the absence of university support during grant writing season when administrative staff are on their summer holidays.

“Just when most academics are due for a break, right when most universities shut down and take offline all of their support services, RGMS [online application process] opens up.” (Major city Not Go8, Level D, ID20)

Home-life theme 2: Time spent on work at home

For most researchers the only solution to managing their workload is to work at home in the evenings and on weekends; even while on holidays or recovering from health issues.

“My life is completely dominated by the need to get the grant applications completed on time - I almost can't think of anything else for 2–3 months!” (Major city Not Go8, Level C, ID40)

“I have sacrificed personal time, holidays, many social and work commitments, sleep, exercise and much more to devote months to writing grants.” (Major city Not Go8, Level E, ID91)

Some researchers questioned why they continue in a research career with such uncertainty and significant negative impacts on their health.

“It makes me ill. I have developed migraine phenotypes for the first time in my life whilst writing grants.” (Major city Go8, Level D, ID87)

“This year was particularly bad and by the end of it I was an emotional wreck.” (Major city Go8, Level C, ID159)

Home-life theme 3: Impact on children

Researchers with responsibilities for children, especially young children, express their frustration and guilt as they “neglected” their children to give top priority to their grant writing.

“I have a young family and our lives are put on hold for 3 months at the worst possible time of year. We have to pay for childcare so there is a huge financial cost plus the personal cost of not being with my children.” (Major city Go8, Level B, ID19)

“My husband and I are both researchers funded by the NHMRC and we have two young children. We are finding this time incredibly stressful and often feel as if our children are being disadvantaged through lack of quality parenting time.” (Major city Go8, Level C, ID51)

Many researchers are appalled at the lack of family friendly policies around the timing for Australian funding schemes.

“What should be the happiest time of the year (kids on holiday, summer, Christmas) is now the most stressful because of the perfect storm of ARC & NHMRC grant deadlines and teaching commitments for the new year.” (Major city Not Go8, Level C, ID101)

An early career researcher reported on the guilt felt from being absent for important events in their child’s life while preparing their proposal:

“You will always have mother's guilt, now I have grant writing guilt!” (Major city Go8, Level A, ID55)

Home-life theme 4: Stress at home

The stress on researchers during preparation of their proposals over-flows into their personal lives and family relationships. Researchers are stressed and leading unhealthy lifestyles during grant-writing season and the rest of the household is negatively impacted.

“Negative impact on sleep and health, family life, school holiday period; on domestic chores, cleanliness, tidiness and healthy eating at home... makes me angry!” (Major city Go8, ID34)

“This also had flow on effects for family life... [a] tired and cranky, stressed family member (me) was very disruptive to family life.” (Major city Not Go8, Level A, ID69)

The low chance of success further adds to the stress as researchers consider the impact of unsuccessful proposals on their continuing employment and providing for their family.

“I feel depressed by the fact that grants that received very good [peer review] comments got culled, [and] not even being ranked.” (Major city Go8, Level B, ID117)

Home-life theme 5: Impact on family and friends

The grant writing season directly impacts on researchers' personal relationships and carer responsibilities for children and ageing parents. The "annual problem" of grant season is an ongoing issue for personal relationships that must either adapt to the seasonal restrictions or be sidelined.

"My family hates my profession. Not just my partner and children, but my parents and siblings. The insecurity despite the crushing hours is a soul destroying combination that is not sustainable." (Major city Go8, Level B, ID19)

"Only the strongest relationships survive ... I focus on only the closest family members [for] maintaining relationships. Other relationships have had to adapt to the annual problem or, more often, disintegrate." (Major city Go8, Level D, ID26)

Home-life theme 6: Impact on partner

In addition to comments on family and friends that include their partner, some researchers specifically report the impact on their partner. Having a supportive partner is crucial for some researchers to have sufficient time to prepare their proposals.

"I limit family holidays, spend less time with my young children (particularly during their summer school holidays) and I get almost no other research work done for 3 months. This is only possible because my partner is very understanding." (Major city Go8, Level E, ID108)

"My spouse had to take over a lot of my responsibilities at home... due to the instability of a research job, he is the main breadwinner at home, and [he also] has a very stressful, demanding job." (Major city Not Go8, Level B, ID36)

Mental health and well-being

Additional impacts on mental health and well-being were identified through comments including: “incredible anxiety”, “depressed”, “despondent”, “insecurity”, and “soul-destroying”. The mental health and welfare of researchers warrants further examination beyond this study.

Discussion

Workload, stress and family

The current study provides the first empirical evidence of the personal experience of Australian researchers as applicants for funding. It provides strong indications of worker stress and burnout. Anecdotal stories of the impact of grant writing are common in conversations among researchers, especially those with young children [19]. The findings from our study provide the empirical evidence that grant writing has significant negative impact on researchers’ personal lives, health and well-being.

Our findings showed some researchers were willing to accept the workload to prepare grant proposals. Others felt there was little choice but to accept the tough reality of seeking research funding in Australia. Academic career development and continuing employment depends strongly on successfully obtaining funding, and this was accepted as the status quo for research careers. Another reason motivating researchers to submit grant proposals was that institutions expect their researchers to apply for funding regardless of their likely chance of success. There is a general atmosphere of pressure from colleagues to submit proposals. As a consequence, the time demands required to prepare proposals can move the pressure of other workloads onto colleagues.

Strengths and limitations

This is the first Australian study providing empirical evidence of the significant negative impact of applying for funding on researchers' productivity, health and well-being. It also provides first-time evidence of impact on home and family life due to the grant writing season for the major Australian funding source for health and medical research. Further, it highlights the problems in Australia arising from preparing proposals for a single annual funding deadline.

Researchers responding to the survey may not be representative of the complete population of researchers. However, our sample did report a history of successfully gaining funding from NHMRC Project Grants. Researchers from early-career (Level A) to Professor (Level E) provided comments on their personal lives so the difficulties were not just confined to new academics who may not know how to work the system or are disorganised. A larger sample of researchers from major cities is unlikely to alter the findings from the qualitative analysis. Researchers from regional areas were a minority and a larger sample may provide for comparisons between researchers in regional areas or major cities. The costs to the mental health and well-being of the researcher or their family members could not be quantified in this study and requires further examination.

Funding deadlines

A single annual deadline places enormous pressure on Australian researchers to prepare their proposals. Changing the timing of the annual funding scheme, or following international schemes with multiple rounds per year, will have wide-ranging benefits for Australian researchers especially those with children [19]. Successfully gaining annual funding is one of the most important tasks researchers need to achieve. Sometimes researchers feel pressure to

1
2
3 apply for inappropriate reasons or before they have a competitive track record. Researchers
4
5 go to extraordinary lengths to prepare good proposals, often sacrificing family time and
6
7 personal relationships. Much of the stress comes from having a heavily bureaucratic process
8
9 that demands a lot of work and data from researchers for a single annual deadline. The grant
10
11 writing season may *only* last over three summer months however researchers place enormous
12
13 importance on this time because the consequences are a delay of one year before the next
14
15 opportunity to apply.
16
17
18
19

20
21 **Work–home conflict**

22
23 The impact of funding schemes on workplace stress in an academic environment has been
24
25 examined. A survey of over 1,100 US research administrators from 2007 to 2010 found
26
27 almost 90% of administrators had increasing work demands and stress, with increasing
28
29 impact on their family responsibilities [20]. Although Shambrook (2012) focussed
30
31 specifically on research administrators and not the academic researchers, the findings
32
33 highlight the personal costs of applying for funding spreads beyond the lead investigators.
34
35 More than a decade of research has been conducted on the impact of having children on the
36
37 careers of tenure-track US academics [21]. Equivalent tenure-track positions do not exist for
38
39 Australian academic researchers therefore the need to secure research funding is imperative
40
41 for continuing employment to provide for their families.
42
43
44
45
46

47
48 The personal cost and stress of being an Australian academic has been investigated. The
49
50 National University Stress Study compared two surveys (2000 and 2003/4) of 447 academics
51
52 and found increasing work pressure predicted increasing work–home conflict and
53
54 psychological strain [22]. Another survey from 2004 to 2008 showed Australian academics
55
56 were less satisfied with their work–home balance compared with employees in other
57
58
59
60

1
2
3 industries [23, 24]. Advances in technology have added to the personal workloads of all
4
5 Australians creating time poverty and household stress [25]. The mobility provided by a
6
7 laptop and home internet connection facilitates the work–home conflict as researchers can
8
9 continue their research and grant writing at almost any time. Further, researchers under
10
11 pressure to manage their workload may find it difficult to resist confining work to normalised
12
13 hours.
14

15
16
17
18 The negative impacts of grant writing on personal and family life are usually anecdotal or
19
20 hidden in the grey literature [19, 26], and go unreported in publications on academic work
21
22 life. Other research focuses on the burden on peer reviewers and administrators and not the
23
24 applicants [27]. Innovative policies from funding agencies can reduce the burden on
25
26 applicants and facilitate the reduction in personal workloads on researchers and be more
27
28 family friendly. The personal impact of unsuccessful proposals with a lack of feedback on the
29
30 reasons for failure may be adding to the negative experiences of researchers as applicants.
31
32 Anecdotally, some researchers have been depressed and despondent about trying again in the
33
34 next funding round. The level of mental health and mood disorders of researchers during the
35
36 funding rounds needs to be explored.
37
38
39
40
41
42

43 **Conclusion**

44
45 As demonstrated by international funding agencies, having more than a single annual
46
47 deadline would distribute the funding opportunities across the year. The process of preparing
48
49 grant proposals for a single annual deadline is stressful, time consuming and conflicts with
50
51 family responsibilities. The timing of the funding cycle could be shifted to minimise
52
53 applicant burden, give Australian researchers more time to work on actual research and to be
54
55 with their families.
56
57
58
59
60

Acknowledgements The authors are grateful to the Australian researchers who provided the survey data. The sole role of the NHMRC in this project is as the research funder.

Contributors DH, PC, NG and AGB conceived and designed the study. DH and AGB analysed the descriptive data. DH and JC analysed the qualitative data. All authors interpreted the data, drafted the article or revised it critically for important intellectual content and approved the version to be published. AGB is the study chief investigator and guarantor.

Funding This work was funded by the National Health and Medical Research Council (NHMRC Project Grant number 1023735).

Competing interest declaration All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare their academic, non-financial interests that may be relevant to the funding of research. DLH salary is supported from NHMRC funding. JC receives funding from NHMRC, ARC and several other state funding agencies. PC receives funding from NHMRC, NIH and several other national and international health funding agencies. NG receives funding from NHMRC, ARC, NIHR, QLD Government and is the academic director of the Australian Centre for Health Services Innovation. AGB receives funding from NHMRC and QLD Government.

Ethics approval Queensland University of Technology Ethics Committee (1300000210).

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement All the data collected as part of this study are available to interested researchers through ethical approval from the QUT Human Research Ethics Committee. Please contact Adrian Barnett (a.barnett@qut.edu.au) if you are interested in accessing the data.

Transparency declaration DH and AGB affirm that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study

have been omitted; and that any discrepancies from the study as planned have been explained.

References

1. Bonetta L. Enhancing NIH grant peer review: a broader perspective. *Cell* 2008; 135(2): 201-204.
2. Van Noorden R, Brumfiel G. Fixing a grant system in crisis. *Nature* 2010; 464(7288): 474-475.
3. Canadian Institutes of Health Research. *Designing for the future: the new Open Suite of Programs and peer review process*. CIHR: Ontario. 2013.
www.cihr-irsc.gc.ca/e/documents/or_des_for_future-en.pdf
4. Guthrie S, Guerin B, Wu H, et al. *Alternatives to peer review n research project funding*. RAND Corporation (Europe). 2013.
www.rand.org/pubs/research_reports/RR139.html
5. Australian Government. *Strategic review of health and medical research in Australia: better health through research*. Department of Health and Ageing: Canberra. 2013.
www.mckeonreview.org.au
6. Herbert DL, Barnett AG, Clarke P, et al. On the time spent preparing grant proposals: an observational study of Australian researchers. *BMJ Open* 2013; 3(5): e002800.
7. Herbert DL, Barnett AG, Graves N. Funding: Australia's grant system wastes time. *Nature* 2013; 495(7441): 314.
8. Alberts B. Overbuilding research capacity. *Science* 2010; 329(5997): 1257.
9. National Health and Medical Research Council. *Research funding facts book 2012*. NHMRC: Canberra. 2013.
www.nhmrc.gov.au/_files_nhmrc/publications/attachments/nh161_nhmrc_funding_facts_book_130809.pdf

1
2
3 10. National Health and Medical Research Council. *Funding rate and funding by funding*
4 *scheme*. NHMRC: Canberra. 2013. [http://www.nhmrc.gov.au/grants/outcomes-](http://www.nhmrc.gov.au/grants/outcomes-funding-rounds)
5 [funding-rounds](http://www.nhmrc.gov.au/grants/outcomes-funding-rounds)
6
7
8
9
10 11. Barnett AG, Herbert DL, Clarke P, et al. The research lottery: the pressures on the
11 Australian grant system. *AQ: The Australian Quarterly* 2014; 85(1): 4-9.
12
13 12. European Science Foundation. *European peer review guide: integrating policies and*
14 *practices into coherent procedures*. 2011. www.esf.org
15
16
17 13. Engineering and Physical Sciences Research Council. *Funding guide. Arrangements*
18 *and procedures for research grants and research fellowships*. EPSRC: Swindon.
19 2013. www.epsrc.ac.uk/SiteCollectionDocuments/FundingGuide.pdf
20
21
22 14. Medical Research Council. *Handbook for applicants and grant holders*. MRC:
23 London. www.mrc.ac.uk/Fundingopportunities
24
25 15. National Institutes of Health. *SF424 (R&R) application guide for NIH and other PHS*
26 *agencies*. NIH: USA. 2013.
27 grants.nih.gov/Grants/funding/424/SF424_RR_Guide_General_Adobe_VerB.pdf
28
29 16. National Science Foundation. Grant proposal guide. NSF: USA. 2011. p I-3.
30 www.nsf.gov/pubs/policydocs/pappguide/nsf11001/gpgprint.pdf
31
32 17. Wood F, Wessely S. Peer review of grant applications. *Peer Review in Health*
33 *Sciences* 2003. British Medical Association Publications: London p14-44.
34
35 18. Australian Bureau of Statistics. *Australia Remoteness Area, Australian Standard*
36 *Geographical Classification (ASGC)*. ABS: Canberra. 2006.
37 www.abs.gov.au/AUSSTATS
38
39 19. Jacobson K. Six steps to fairer funding for female scientists. *The Conversation* 24
40 October 2013. [http://theconversation.com/six-steps-to-fairer-funding-for-female-](http://theconversation.com/six-steps-to-fairer-funding-for-female-scientists-16895)
41 [scientists-16895](http://theconversation.com/six-steps-to-fairer-funding-for-female-scientists-16895)
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
20. Shambrook JF. Comparison of stress-related factors in the 2007 and 2010 Research Administrator Stress Perception Surveys (RASPerS). *Journal of Research Administration* 2012; 43(2): 107-118.
21. Mason MA, Wolfinger NH, Goulden M. Alone in the ivory tower. *Do babies matter? Gender and family in the ivory tower* Rutgers University Press: New Jersey. 2013. Ch. 4: 59-82. <http://rutgerspress.rutgers.edu/product/Do-Babies-Matter,4767.aspx>
22. Winefield T, Boyd C, Saebel J, et al. Update on National University Stress Study. *Australian Universities' Review* 2008; 50(1): 20-29.
23. Langford PH. Benchmarking work practices and outcomes in Australian universities using an employee survey. *Journal of Higher Education Policy & Management* 2010; 32(1): 41-53.
24. Bentley PJ, Coates H, Dobson IR, et al. *Factors associated with job satisfaction amongst australian university academics and future workforce implications*. Job Satisfaction around the Academic World. Springer: Dordrecht. 2012. p29-54.
25. Pocock B, Skinner N, Williams P. *Time bomb: work, rest and play in Australia today*. 2012. NewSouth Publishing: Sydney.
26. Decker RS, Wimsatt L, Trice AG, et al. *A profile of federal-grant administrative burden among Federal Demonstration Partnership faculty*. Faculty Standing Committee of the Federal Demonstration Partnership: USA. 2007. http://www.iscintelligence.com/archivos_subidos/usfacultyburden_5.pdf
27. Demicheli V, Di Pietrantonj C. Peer review for improving the quality of grant applications. *Cochrane Database Of Systematic Reviews (Online)* 2007; April 18 (2): MR000003.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

Box 1 International comparison of submission deadlines			
Country	Funding Agency	Funding Scheme	Annual Submissions (Month)
Australia	National Health & Medical Research Council, NHMRC	Project Grant	One (Mar)
Canada	Canadian Institute of Health Research, CIHR	Open Suite of Programs	Two (Mar, Sep)
UK	Engineering and Physical Science Research Council, EPSRC	Standard Grant	Continuously open
UK	Medical Research Council, MRC	Research Grant	Three (Jan, May, Sep)
USA	National Institutes of Health, NIH	RO1 Research Grant	Three (Feb, Jun, Oct)
USA	National Science Foundation, NSF	Program Grant	Continuously open

Box 2 Impact of single annual funding deadline on work–life and home–life	
Work– life themes	Home–life themes
1) Top priority	1) Restricting family holidays
2) Career development	2) Time spent on work at home
3) Stress at work	3) Impact on children
4) Benefits at work	4) Stress at home
5) Time spent at work	5) Impact on family and friends
6) Pressure from colleagues	6) Impact on partner

Table 1 Characteristics of the researchers

Characteristic	Researchers (n=215)
Current academic level (example role)	%
Level A (Assistant Lecturer)	7
Level B (Lecturer)	19
Level C (Senior Lecturer)	27
Level D (Associate Professor)	15
Level E (Professor)	24
Prefer not to answer	1
Missing	7
Location of primary institution	
Major city, Group of Eight (Go8) ^a	51
Major city, Not Go8	37
Regional	4
Prefer not to answer	1
Missing	7
Chief Investigator (CI) role ^b	
Grants currently held	
None	32
1–2	43
3–4	9
5–6	4
Missing	13
Proposals submitted in latest round	
None	15
1–2	49
3–4	22
5–6	2
Missing	12

Percentages may not add to 100% due to rounding.

^a Research intensive university part of the Group of Eight (Go8).

^b Funding rules stipulate a maximum of six grants per CI.

Table 2 Impact of grant writing on the researchers, by location of primary institution

Personal workloads	Row %	Researchers, n=215	
		Agree	Disagree
I give top priority to writing my proposals over my other work commitments			
Major city, Group of Eight (Go8) ^a		98	2
Major city, Not Go8		95	5
Regional		100	0
I give top priority to writing my proposals over my personal commitments			
Major city, Go8		90	10
Major city, Not Go8		83	17
Regional		89	11
I get stressed by the workload required to write my proposals			
Major city, Go8		92	8
Major city, Not Go8		95	5
Regional		89	11
I restrict any holidays with my family and friends to focus on writing my proposals			
Major city, Go8		90	10
Major city, Not Go8		86	14
Regional		89	11
Motivation to submit proposals			
I submit proposals each year because chance is involved in being funded			
Major city, Go8		75	25
Major city, Not Go8		72	28
Regional		89	11
I submit proposals to meet the academic performance requirements of my institution			
Major city, Go8		60	41
Major city, Not Go8		57	44
Regional		78	22
I feel pressure from my colleagues to submit proposals			
Major city, Go8		53	47
Major city, Not Go8		48	51
Regional		78	22

Missing data not shown. Row percentage may not add to 100 due to rounding.

^a Research intensive university part of the Group of Eight (Go8).

Title The impact of funding deadlines on personal workloads, stress and family relationships:
a qualitative study of Australian researchers

Authors Danielle L Herbert, John Coveney, Philip Clarke, Nicholas Graves, Adrian G
Barnett

Address for each author DLH, NG, AGB: School of Public Health and Social Work &
Institute of Health and Biomedical Innovation, Queensland University of Technology, 60
Musk Ave, Kelvin Grove, Brisbane, Queensland 4059, Australia.

DLH: Postdoctoral Research Fellow. NG: Professor of Health Economics. AGB: Principal
Research Fellow.

JC: School of Medicine, Flinders University, GPO Box 2100, Adelaide, South Australia
5001, Australia.

JC: Professor of Public Health.

PC: Melbourne School of Population and Global Health, The University of Melbourne, 207-
221 Bouverie St, Parkville, Melbourne, Victoria 3010, Australia.

PC: Professor of Health Economics.

Corresponding author

DLH: Danielle L Herbert Email: d2.herbert@qut.edu.au

Abstract word count: 282

Manuscript word count: 4359

Abstract

Objective To examine the impact of applying for funding on personal workloads, stress and family relationships.

Design Qualitative study of researchers preparing grant proposals.

Setting Web-based survey on applying for the annual National Health and Medical Research Council (NHMRC) Project Grant scheme.

Participants Australian researchers (n=215).

Results Almost all agreed preparing their proposals always took top priority over other work (97%) and personal (87%) commitments. Almost all researchers agreed that they became stressed by the workload (93%) and restricted their holidays during the grant writing season (88%). Most researchers agreed that they submitted proposals because chance is involved in being successful (75%), due to performance requirements at their institution (60%), and pressure from their colleagues to submit proposals (53%). Almost all researchers supported changes to the current processes to submit proposals (95%) and peer-review (90%). Most researchers (59%) provided extensive comments on the impact of writing proposals on their work–life and home–life. Six major work–life themes were: 1) top priority; 2) career development; 3) stress at work; 4) benefits at work; 5) time spent at work; and 6) pressure from colleagues. Six major home–life themes were: 1) restricting family holidays; 2) time spent on work at home; 3) impact on children; 4) stress at home; 5) impact on family and friends; and 6) impact on partner. Additional impacts on the mental health and well-being of researchers were identified.

Conclusions The process of preparing grant proposals for a single annual deadline is stressful, time consuming and conflicts with family responsibilities. The timing of the funding cycle could be shifted to minimise applicant burden, give Australian researchers more time to work on actual research and to be with their families.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Strengths and limitations

- This is the first Australian study providing empirical evidence of the significant negative impact of applying for a single annual funding deadline on researchers’ productivity, health and well-being.
- This study found the process of preparing grant proposals is stressful, time consuming and conflicts with responsibilities for children and family.
- Researchers responding to the survey may not be representative of the complete population of researchers however they did report a history of successfully gaining funding.
- The costs to the mental health and well-being of the researcher or their family members could not be quantified in this study and requires further examination.

Introduction

Large amounts of time are invested by academics preparing funding proposals to support their research. A successful proposal provides an obvious pay-off but the costs could be felt personally with stress placed on private lives during grant writing seasons, and subsequent rebuttal periods. Despite the worldwide importance of research funding and peer review processes, there is little evidence on the personal costs on researchers to prepare funding proposals.

Personal costs could possibly be reduced by streamlining application processes. Some funding agencies have made changes to reduce the burden on applicants and their peer review systems. The US National Institute of Health (NIH) shortened their applications **with the intention to reduce the burden on the administration, peer reviewers and applicants [1]**. The UK Engineering and Physical Sciences Research Council trialled strict submission rules for previously unsuccessful applicants to reduce the peer review workload, but this change was met by strong protests from researchers [2]. The Canadian Institutes of Health Research reviewed their funding schemes specifically to reduce applicant workload [3], but they did not investigate other areas of personal burden. The RAND Corporation (Europe) has recognised the burden on applicants during the development and refinement of a proposal [4]. The 2012 McKeon review into Australian research funding recommended the streamlining of grant proposals to minimise the burden on applicants [5]. These changes are a clear acknowledgement of the workload and other impacts of applying for research funding. However, as yet these impacts on applicants have not been examined.

In 2012, Australian researchers spent an estimated 550 years preparing 3,727 proposals (21% were funded) for the major National Health and Medical Research Council (NHMRC) funding scheme, at an estimated annual salary cost of AU\$66 million [6, 7]. These figures underestimate the total cost because they do not include administrative or technical support, peer review, and do not include the personal costs and impacts on family and relationships.

Alberts (2010) stated the reliance in the US on NIH funding to expand research capacity is unsustainable when the success rates can be below 10% [8]. The pattern is similar in Australia as the number of proposals submitted to the NHMRC is rising steadily and the success rate declined to 17% in 2013 [9, 10]. If this pattern continues the prediction is that more than 5000 proposals may be submitted to the major NHMRC funding scheme in 2017 [11]. International agencies have implemented initiatives to reduce the total number of proposals being submitted by barring unsuccessful proposals from previous years [2, 11].

The European Science Foundation makes the distinction between funding schemes that are either ‘managed’ by setting timelines and deadlines for each funding cycle, or are ‘responsive’ to the receipt of proposals for funding cycles that are continuously open [12]. The NHMRC major funding scheme is ‘managed’ for a single deadline [9] and differs from comparable international funding schemes where multiple deadlines are available or schemes are continuously open, e.g., Canada [3], UK [13, 14] and USA [15, 16] (Box 1). Funding schemes are expected to be efficient, fair and rational [17], however the impact of a single submission deadline has not previously been examined.

This study sets out to ask the researcher about their experience as applicants when preparing funding proposals for a single annual funding deadline, and the consequences for their work and home lives.

Methods

Study design

The NHMRC Project Grant is the main scheme for funding health and medical research in Australia and has a single annual deadline for submission. In March 2013, Australian researchers submitted 3,916 proposals to the NHMRC Project Grant funding scheme, and 17% were funded. In May 2013, email invitations to participate in a web-based survey were distributed to the research community through existing networks from previous studies [6]. The target group was researchers with the experience of applying for a NHMRC Project Grant either in 2013 or previous funding rounds. Researchers responded from May to July 2013 and took 10–20 minutes to complete the survey depending on how many additional comments they provided. This study was approved by the Queensland University of Technology Ethics Committee (1300000210).

Survey questions

The survey questions were developed to ask the researcher about their experience of applying for NHMRC Project Grants. To gauge the representativeness of our sample we asked for geographical locations (major city, inner regional, outer regional or remote) [18], academic level (early-career (Level A) to Professor (Level E)) and whether the researcher's university belonged to one of eight research intensive universities known as the Group of Eight (Go8,

www.go8.edu.au). All Go8 universities are located in major cities and in 2012 they received 63% of all NHMRC funding (AU\$408 million) [9].

As indicators of experience with writing proposals and prior success, researchers were asked for the number of NHMRC Project Grants they currently held as a Chief Investigator (CI), and the number of proposals submitted in March 2013. CIs can hold a maximum of six Project Grants at one time. The characteristics of the researchers and those providing comments are compared in Table 1. The survey included separate sections on personal workloads and motivations to submit proposals. Researchers were asked to rate their agreement (strongly agree to strongly disagree) with the statements in Table 2. For presentation purposes we summarised the responses into agree or disagree. A free-text option was provided for personal workloads after the open-ended prompt: “Please tell us more about the impact of grant writing season on your work and personal life”.

Qualitative analysis

From 239 survey respondents, 24 were excluded from the analysis due to: only answering the initial one or two survey questions and having missing data for the majority (n=10); not holding an academic position (n=12); or being a PhD student (n=2). The analysis focussed on the 215 researchers who currently held academic positions (n=200, providing 122 comments) or maintained anonymity by not providing academic level (n=15, five comments). From the free-text comments for personal workloads, factors relating to researchers’ experience of preparing their proposals were identified and explored using thematic analysis. All comments were categorised by academic level and location of primary institution.

The broad themes within each category were examined by DH and AGB prior to a secondary thematic analysis by JC (an experienced qualitative researcher). Excerpts were sorted into initial groupings by DH. These excerpts revealed the themes relating to the impacts on work–life and home–life. DH, JC and AGB reviewed these themes and agreed on the coding framework. All comments were then coded by DH according to the identified themes using NVivo 9 (QSR International Pty Ltd., 2010). JC reviewed the coding in detail and any minor discrepancies were resolved. Through the analytic process, and the building up of the coding framework, the themes common to each academic level, and Go8 versus non-Go8 universities, were identified. The research team developed the interpretations of these themes with in-depth discussion to reach a consensus for the analysis.

Results

Among 215 researchers, academic level ranged from early career (Level A and B) to senior levels (Level D and E), and almost all were at institutions in major cities (88%). More than half the researchers were currently recipients of NHMRC Project Grants as Chief Investigators, and most had submitted proposals in the 2013 funding round. Almost all researchers supported changes to the current NHMRC processes to prepare and submit proposals (71% major; 24% minor) and peer-review (60% major; 30% minor). More than half of the researchers (59%) provided extensive comments on the ongoing personal impact of concurrent grant-writing and holiday seasons on their work–life and home–life. The characteristics of those providing comments (n=127) were similar to the complete sample (Table 1).

1
2
3 Researchers agreed preparing their grant proposals always took top priority over other work
4 (97%) and personal (87%) commitments (Table 2). Almost all researchers agreed that they
5 became stressed by the workload (93%) and restricted their holidays during the grant writing
6 season (88%). Most researchers agreed there were other motivations to submit proposals,
7 including: the element of chance in being successful (75%), as performance requirements at
8 their institution (60%) or because of pressure from their colleagues (53%).
9
10
11
12
13
14
15
16
17

18 A small number of researchers disagreed and reported preparing their grant proposals did not
19 take over their work (3%) and they did not become stressed (7%). These researchers provided
20 comments on planning ahead and starting early on their proposals. They acknowledged the
21 system was designed to be tough and reported “those academics who can’t handle it shouldn’t
22 hold NHMRC grants.”
23
24
25
26
27
28
29
30
31

32 **Thematic analysis of work–life**

33 Six major themes are identified for the impact of applying for funding on each of work–life
34 and home–life (Box 2). These themes are described below in descending order of frequency,
35 along with a number of indicative quotes. The quotes have been minimally edited for
36 readability while preserving the meaning; the location of primary institution and academic
37 level of the researcher are in parenthesis.
38
39
40
41
42
43
44
45
46

47 For work–life, the six major themes are: 1) top priority; 2) career development; 3) stress at
48 work; 4) benefits at work; 5) time spent at work; and 6) pressure from colleagues.
49
50
51
52
53

54 **Work–life theme 1: Top priority**
55
56
57
58
59
60

Preparing and submitting grant proposals were given top priority over all other work commitments. Gaining funding was important to continue research and maintain staff however it came at the cost of stopping current research from progressing.

“Without successful grants there is no money for work, no salary and hence no living.”

(Major city Go8, Level B, ID6)

“I feel like my life is on hold for the 1st 2–3 months of the year and that my real work i.e. doing the research and writing papers suffers as a consequence.” (Major city Go8, Level D, ID30)

Work–life theme 2: Career development

The success or failure of researchers to gain funding has direct impact on their career. Successfully gaining funding was rewarded by future promotion and is the key indicator of being a competitive researcher on the international stage.

“If I don’t get a grant, I will never be promoted!” (Major city Not Go8, Level C, ID59)

Increasing time spent preparing proposals may be seen as an indicator of being uncompetitive or disorganised.

“The people who complain about lack of time are those who are unorganised or who have poor ideas/preliminary data for grants.” (Major city Not Go8, Level B, ID98)

However, researchers with a competing teaching load need to juggle these competing demands beyond simply being organised or starting early.

“Most academics have other commitments, teaching and supervision, occasionally even actually doing research, which takes up a large amount of time at other times of year.”

(Major city Not Go8, Level C, ID36)

Work–life theme 3: Stress at work

1
2
3 Researchers are under considerable stress while preparing their proposals and waiting for
4
5 peer review reports.
6

7 “The NHMRC grant system is the single worst aspect of my job as a research academic.”

8
9 (Regional, Level D, ID149)
10

11 “The stress is largely induced by knowing that the chance of anyone with even a
12
13 modicum of expertise in your field reviewing your grant is basically zero.” (Major city
14
15 Go8, Level C, ID24)
16
17

18 Additional pressure is placed on researchers as they acknowledge their low chance of success
19
20 and question the likelihood of ongoing employment.
21

22 “It is very stressful to spend a lot of time and effort writing a proposal that has a very low
23
24 chance of success... Many people anxiously await the grant outcome to see if they are
25
26 out of work in six weeks.” (Major city Not Go8, Level D, ID125)
27
28
29
30
31

32 **Work-life theme 4: Benefits at work**
33

34 The benefits of applying for funding were divided into personal benefits (positive) and
35
36 competitive benefits for peer reviewers (negative). Some researchers acknowledged the
37
38 personal benefits of writing their proposals as their team brainstormed and refined new
39
40 scientific ideas.
41

42 “I do it because our teams do have real sparks that happen during the proposal process
43
44 which leads to new ideas and new directions.” (Major city Not Go8, Level D, ID68)
45
46

47 Other senior researchers reported on the gaming of the peer review process.
48

49 “It rewards people who know how to 'play the system' rather than the value of the
50
51 science...there are a lot of people within the system who 'look after each other'. You
52
53 review for me and I'll review for you.” (Major city Not Go8, Level E, ID23)
54
55
56
57
58
59
60

Work-life theme 5: Time spent at work

As the priority at work is to prepare grant proposals, the time spent on other work spreads beyond the standard working day. Researchers work at nights and on weekends, especially those with concurrent teaching roles.

“Late nights, neglect staff and students, mental exhaustion, intense frustration with RGMS [the online application system].” (Major city Go8, Level E, ID22)

Work-life theme 6: Pressure from colleagues

Some researchers feel pressure from their colleagues to submit proposals to meet the requirements of their institution.

“University pressure to submit NHMRC grants because [they are] valued above all else.” (Major city Not Go8, Level E, ID14)

The pressure to submit proposals limits the time available to publish which would, in turn, improve the likelihood of being funded.

“Grant writing severely impacts on getting papers written...[and] impacts on [my] track record, making it less likely that grants applied for will be funded.” (Major city Go8, Level C, ID143)

For senior researchers their involvement in funding proposals includes the internal review and administration of other proposals; often to the exclusion of contact with their collaborators, junior researchers or students.

Thematic analysis of home-life

For home-life, the six major themes are: 1) restricting family holidays; 2) time spent on work at home; 3) impact on children; 4) stress at home; 5) impact on family and friends; and 6) impact on partner.

Home-life theme 1: Restricting family holidays

The conflict between the single annual funding deadline and spending holidays with children and family is a recurring issue for researchers with family responsibilities. Most university research offices require the application up to five weeks before the deadline so that most researchers work on the application over the Australian summer when the community takes extended Christmas holidays. The summer holiday season is also the longest school holiday period (6-8 weeks) in Australia and many researchers express their frustration and guilt at not spending more time with their children and families.

“The process is too involved with a very low success rate, and is poorly timed over Christmas holidays! This year I opted out of applying to improve my family.” (Major city Go8, Level C, ID27)

“My family chose to go away without me, or not to go away at Christmas time.” (Major city Go8, Level D, ID28)

Other researchers report the absence of university support during grant writing season when administrative staff are on their summer holidays.

“Just when most academics are due for a break, right when most universities shut down and take offline all of their support services, RGMS [online application process] opens up.” (Major city Not Go8, Level D, ID20)

Home-life theme 2: Time spent on work at home

For most researchers the only solution to managing their workload is to work at home in the evenings and on weekends; even while on holidays or recovering from health issues.

“My life is completely dominated by the need to get the grant applications completed on time - I almost can't think of anything else for 2–3 months!” (Major city Not Go8, Level C, ID40)

“I have sacrificed personal time, holidays, many social and work commitments, sleep, exercise and much more to devote months to writing grants.” (Major city Not Go8, Level E, ID91)

Some researchers questioned why they continue in a research career with such uncertainty and significant negative impacts on their health.

“It makes me ill. I have developed migraine phenotypes for the first time in my life whilst writing grants.” (Major city Go8, Level D, ID87)

“This year was particularly bad and by the end of it I was an emotional wreck.” (Major city Go8, Level C, ID159)

Home-life theme 3: Impact on children

Researchers with responsibilities for children, especially young children, express their frustration and guilt as they “neglected” their children to give top priority to their grant writing.

“I have a young family and our lives are put on hold for 3 months at the worst possible time of year. We have to pay for childcare so there is a huge financial cost plus the personal cost of not being with my children.” (Major city Go8, Level B, ID19)

“My husband and I are both researchers funded by the NHMRC and we have two young children. We are finding this time incredibly stressful and often feel as if our children are being disadvantaged through lack of quality parenting time.” (Major city Go8, Level C, ID51)

Many researchers are appalled at the lack of family friendly policies around the timing for Australian funding schemes.

“What should be the happiest time of the year (kids on holiday, summer, Christmas) is now the most stressful because of the perfect storm of ARC & NHMRC grant deadlines and teaching commitments for the new year.” (Major city Not Go8, Level C, ID101)

An early career researcher reported on the guilt felt from being absent for important events in their child’s life while preparing their proposal:

“You will always have mother's guilt, now I have grant writing guilt!” (Major city Go8, Level A, ID55)

Home-life theme 4: Stress at home

The stress on researchers during preparation of their proposals over-flows into their personal lives and family relationships. Researchers are stressed and leading unhealthy lifestyles during grant-writing season and the rest of the household is negatively impacted.

“Negative impact on sleep and health, family life, school holiday period; on domestic chores, cleanliness, tidiness and healthy eating at home... makes me angry!” (Major city Go8, ID34)

“This also had flow on effects for family life... [a] tired and cranky, stressed family member (me) was very disruptive to family life.” (Major city Not Go8, Level A, ID69)

The low chance of success further adds to the stress as researchers consider the impact of unsuccessful proposals on their continuing employment and providing for their family.

“I feel depressed by the fact that grants that received very good [peer review] comments got culled, [and] not even being ranked.” (Major city Go8, Level B, ID117)

Home-life theme 5: Impact on family and friends

The grant writing season directly impacts on researchers' personal relationships and carer responsibilities for children and ageing parents. The "annual problem" of grant season is an ongoing issue for personal relationships that must either adapt to the seasonal restrictions or be sidelined.

"My family hates my profession. Not just my partner and children, but my parents and siblings. The insecurity despite the crushing hours is a soul destroying combination that is not sustainable." (Major city Go8, Level B, ID19)

"Only the strongest relationships survive ... I focus on only the closest family members [for] maintaining relationships. Other relationships have had to adapt to the annual problem or, more often, disintegrate." (Major city Go8, Level D, ID26)

Home-life theme 6: Impact on partner

In addition to comments on family and friends that include their partner, some researchers specifically report the impact on their partner. Having a supportive partner is crucial for some researchers to have sufficient time to prepare their proposals.

"I limit family holidays, spend less time with my young children (particularly during their summer school holidays) and I get almost no other research work done for 3 months. This is only possible because my partner is very understanding." (Major city Go8, Level E, ID108)

"My spouse had to take over a lot of my responsibilities at home... due to the instability of a research job, he is the main breadwinner at home, and [he also] has a very stressful, demanding job." (Major city Not Go8, Level B, ID36)

Mental health and well-being

Additional impacts on mental health and well-being were identified through comments including: “incredible anxiety”, “depressed”, “despondent”, “insecurity”, and “soul-destroying”. The mental health and welfare of researchers warrants further examination beyond this study.

Discussion

Workload, stress and family

The current study provides the first empirical evidence of the personal experience of Australian researchers as applicants for funding. It provides strong indications of worker stress and burnout. Anecdotal stories of the impact of grant writing are common in conversations among researchers, especially those with young children [19]. The findings from our study provide the empirical evidence that grant writing has significant negative impact on researchers’ personal lives, health and well-being.

Our findings showed some researchers were willing to accept the workload to prepare grant proposals. Others felt there was little choice but to accept the tough reality of seeking research funding in Australia. Academic career development and continuing employment depends strongly on successfully obtaining funding, and this was accepted as the status quo for research careers. Another reason motivating researchers to submit grant proposals was that institutions expect their researchers to apply for funding regardless of their likely chance of success. There is a general atmosphere of pressure from colleagues to submit proposals. As a consequence, the time demands required to prepare proposals can move the pressure of other workloads onto colleagues.

Strengths and limitations

This is the first Australian study providing empirical evidence of the significant negative impact of applying for funding on researchers' productivity, health and well-being. It also provides first-time evidence of impact on home and family life due to the grant writing season for the major Australian funding source for health and medical research. Further, it highlights the problems in Australia arising from preparing proposals for a single annual funding deadline.

Researchers responding to the survey may not be representative of the complete population of researchers. However, our sample did report a history of successfully gaining funding from NHMRC Project Grants. Researchers from early-career (Level A) to Professor (Level E) provided comments on their personal lives so the difficulties were not just confined to new academics who may not know how to work the system or are disorganised. A larger sample of researchers from major cities is unlikely to alter the findings from the qualitative analysis. Researchers from regional areas were a minority and a larger sample may provide for comparisons between researchers in regional areas or major cities. The costs to the mental health and well-being of the researcher or their family members could not be quantified in this study and requires further examination.

Funding deadlines

A single annual deadline places enormous pressure on Australian researchers to prepare their proposals. Changing the timing of the annual funding scheme, or following international schemes with multiple rounds per year, will have wide-ranging benefits for Australian researchers especially those with children [19]. Successfully gaining annual funding is one of the most important tasks researchers need to achieve. Sometimes researchers feel pressure to

1
2
3 apply for inappropriate reasons or before they have a competitive track record. Researchers
4
5 go to extraordinary lengths to prepare good proposals, often sacrificing family time and
6
7 personal relationships. Much of the stress comes from having a heavily bureaucratic process
8
9 that demands a lot of work and data from researchers for a single annual deadline. The grant
10
11 writing season may *only* last over three summer months however researchers place enormous
12
13 importance on this time because the consequences are a delay of one year before the next
14
15 opportunity to apply.
16
17
18
19

20
21 **Work–home conflict**

22
23 The impact of funding schemes on workplace stress in an academic environment has been
24
25 examined. A survey of over 1,100 US research administrators from 2007 to 2010 found
26
27 almost 90% of administrators had increasing work demands and stress, with increasing
28
29 impact on their family responsibilities [20]. Although Shambrook (2012) focussed
30
31 specifically on research administrators and not the academic researchers, the findings
32
33 highlight the personal costs of applying for funding spreads beyond the lead investigators.
34
35
36 More than a decade of research has been conducted on the impact of having children on the
37
38 careers of tenure-track US academics [21]. Equivalent tenure-track positions do not exist for
39
40 Australian academic researchers therefore the need to secure research funding is imperative
41
42 for continuing employment to provide for their families.
43
44
45
46

47
48 The personal cost and stress of being an Australian academic has been investigated. The
49
50 National University Stress Study compared two surveys (2000 and 2003/4) of 447 academics
51
52 and found increasing work pressure predicted increasing work–home conflict and
53
54 psychological strain [22]. Another survey from 2004 to 2008 showed Australian academics
55
56 were less satisfied with their work–home balance compared with employees in other
57
58
59
60

industries [23, 24]. Advances in technology have added to the personal workloads of all Australians creating time poverty and household stress [25]. The mobility provided by a laptop and home internet connection facilitates the work–home conflict as researchers can continue their research and grant writing at almost any time. Further, researchers under pressure to manage their workload may find it difficult to resist confining work to normalised hours.

The negative impacts of grant writing on personal and family life are usually anecdotal or hidden in the grey literature [19, 26], and go unreported in publications on academic work life. Other research focuses on the burden on peer reviewers and administrators and not the applicants [27]. Innovative policies from funding agencies can reduce the burden on applicants and facilitate the reduction in personal workloads on researchers and be more family friendly. The personal impact of unsuccessful proposals with a lack of feedback on the reasons for failure may be adding to the negative experiences of researchers as applicants. Anecdotally, some researchers have been depressed and despondent about trying again in the next funding round. The level of mental health and mood disorders of researchers during the funding rounds needs to be explored.

Conclusion

As demonstrated by international funding agencies, having more than a single annual deadline would distribute the funding opportunities across the year. The process of preparing grant proposals for a single annual deadline is stressful, time consuming and conflicts with family responsibilities. The timing of the funding cycle could be shifted to minimise applicant burden, give Australian researchers more time to work on actual research and to be with their families.

Acknowledgements The authors are grateful to the Australian researchers who provided the survey data. The sole role of the NHMRC in this project is as the research funder.

Contributors DH, PC, NG and AGB conceived and designed the study. DH and AGB analysed the descriptive data. DH and JC analysed the qualitative data. All authors interpreted the data, drafted the article or revised it critically for important intellectual content and approved the version to be published. AGB is the study chief investigator and guarantor.

Funding This work was funded by the National Health and Medical Research Council (NHMRC Project Grant number 1023735).

Competing interest declaration All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare their academic, non-financial interests that may be relevant to the funding of research. DLH salary is supported from NHMRC funding. JC receives funding from NHMRC, ARC and several other state funding agencies. PC receives funding from NHMRC, NIH and several other national and international health funding agencies. NG receives funding from NHMRC, ARC, NIHR, QLD Government and is the academic director of the Australian Centre for Health Services Innovation. AGB receives funding from NHMRC and QLD Government.

Ethics approval Queensland University of Technology Ethics Committee (1300000210).

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement All the data collected as part of this study are available to interested researchers through ethical approval from the QUT Human Research Ethics Committee. Please contact Adrian Barnett (a.barnett@qut.edu.au) if you are interested in accessing the data.

Transparency declaration DH and AGB affirm that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study

have been omitted; and that any discrepancies from the study as planned have been explained.

References

1. Bonetta L. Enhancing NIH grant peer review: a broader perspective. *Cell* 2008; 135(2): 201-204.
2. Van Noorden R, Brumfiel G. Fixing a grant system in crisis. *Nature* 2010; 464(7288): 474-475.
3. Canadian Institutes of Health Research. *Designing for the future: the new Open Suite of Programs and peer review process*. CIHR: Ontario. 2013.
www.cihr-irsc.gc.ca/e/documents/or_des_for_future-en.pdf
4. Guthrie S, Guerin B, Wu H, Ismail S, Wooding S. *Alternatives to peer review in research project funding*. RAND Corporation (Europe). 2013.
www.rand.org/pubs/research_reports/RR139.html
5. Australian Government. *Strategic review of health and medical research in Australia: better health through research*. Department of Health and Ageing: Canberra. 2013.
www.mckeeonreview.org.au
6. Herbert DL, Barnett AG, Clarke P, Graves N. On the time spent preparing grant proposals: an observational study of Australian researchers. *BMJ Open* 2013; 3(5): e002800.
7. Herbert DL, Barnett AG, Graves N. Funding: Australia's grant system wastes time. *Nature* 2013; 495(7441): 314.
8. Alberts B. Overbuilding research capacity. *Science* 2010; 329(5997): 1257.
9. National Health and Medical Research Council. *Research funding facts book 2012*. NHMRC: Canberra. 2013.

www.nhmrc.gov.au/_files_nhmrc/publications/attachments/nhl161_nhmrc_funding_fa_cts_book_130809.pdf

10. National Health and Medical Research Council. *Funding rate and funding by funding scheme*. NHMRC: Canberra. 2013. <http://www.nhmrc.gov.au/grants/outcomes-funding-rounds>

11. Barnett AG, Herbert DL, Clarke P, Graves N. The research lottery: the pressures on the Australian grant system. *AQ: The Australian Quarterly* 2014; 85(1): 4-9.

12. European Science Foundation. *European peer review guide: integrating policies and practices into coherent procedures*. 2011. www.esf.org

13. Engineering and Physical Sciences Research Council. *Funding guide. Arrangements and procedures for research grants and research fellowships*. EPSRC: Swindon. 2013. www.epsrc.ac.uk/SiteCollectionDocuments/FundingGuide.pdf

14. Medical Research Council. *Handbook for applicants and grant holders*. MRC: London. www.mrc.ac.uk/Fundingopportunities

15. National Institutes of Health. *SF424 (R&R) application guide for NIH and other PHS agencies*. NIH: USA. 2013. grants.nih.gov/Grants/funding/424/SF424_RR_Guide_General_Adobe_VerB.pdf

16. National Science Foundation. *Grant proposal guide*. NSF: USA. 2011. p I-3. www.nsf.gov/pubs/policydocs/pappguide/nsf11001/gpgprint.pdf

17. Wood F, Wessely S. Peer review of grant applications. *Peer Review in Health Sciences* 2003. British Medical Association Publications: London p14-44.

18. Australian Bureau of Statistics. *Australia Remoteness Area, Australian Standard Geographical Classification (ASGC)*. ABS: Canberra. 2006. www.abs.gov.au/AUSSTATS

19. Jacobson K. Six steps to fairer funding for female scientists. *The Conversation* 24 October 2013. <http://theconversation.com/six-steps-to-fairer-funding-for-female-scientists-16895>
20. Shambrook JF. Comparison of stress-related factors in the 2007 and 2010 Research Administrator Stress Perception Surveys (RASPerS). *Journal of Research Administration* 2012; 43(2): 107-118.
21. Mason MA, Wolfinger NH, Goulden M. Alone in the ivory tower. *Do babies matter? Gender and family in the ivory tower* Rutgers University Press: New Jersey. 2013. Ch. 4: 59-82. <http://rutgerspress.rutgers.edu/product/Do-Babies-Matter.4767.aspx>
22. Winefield T, Boyd C, Saebel J, Pignata S. Update on National University Stress Study. *Australian Universities' Review* 2008; 50(1): 20-29.
23. Langford PH. Benchmarking work practices and outcomes in Australian universities using an employee survey. *Journal of Higher Education Policy & Management* 2010; 32(1): 41-53.
24. Bentley PJ, Coates H, Dobson IR, Goedegebuure L, Meek VL. *Factors associated with job satisfaction amongst australian university academics and future workforce implications*. Job Satisfaction around the Academic World. Springer: Dordrecht. 2012. p29-54.
25. Pocock B, Skinner N, Williams P. *Time bomb: work, rest and play in Australia today*. 2012. NewSouth Publishing: Sydney.
26. Decker RS, Wimsatt L, Trice AG, Konstan JA. *A profile of federal-grant administrative burden among Federal Demonstration Partnership faculty*. Faculty Standing Committee of the Federal Demonstration Partnership: USA. 2007. http://www.iscintelligence.com/archivos_subidos/usfacultyburden_5.pdf

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

27. Demicheli V, Di Pietrantonj C. Peer review for improving the quality of grant applications. *Cochrane Database Of Systematic Reviews (Online)* 2007; April 18 (2): MR000003.

For peer review only

Box 1 International comparison of submission deadlines			
Country	Funding Agency	Funding Scheme	Annual Submissions (Month)
Australia	National Health & Medical Research Council, NHMRC	Project Grant	One (Mar)
Canada	Canadian Institute of Health Research, CIHR	Open Suite of Programs	Two (Mar, Sep)
UK	Engineering and Physical Science Research Council, EPSRC	Standard Grant	Continuously open
UK	Medical Research Council, MRC	Research Grant	Three (Jan, May, Sep)
USA	National Institutes of Health, NIH	RO1 Research Grant	Three (Feb, Jun, Oct)
USA	National Science Foundation, NSF	Program Grant	Continuously open

Box 2 Impact of single annual funding deadline on work–life and home–life	
Work– life themes	Home–life themes
1) Top priority	1) Restricting family holidays
2) Career development	2) Time spent on work at home
3) Stress at work	3) Impact on children
4) Benefits at work	4) Stress at home
5) Time spent at work	5) Impact on family and friends
6) Pressure from colleagues	6) Impact on partner

Table 1 Characteristics of the researchers

Characteristic	Researchers (n=215)
Current academic level (example role)	%
Level A (Assistant Lecturer)	7
Level B (Lecturer)	19
Level C (Senior Lecturer)	27
Level D (Associate Professor)	15
Level E (Professor)	24
Prefer not to answer	1
Missing	7
Location of primary institution	
Major city, Group of Eight (Go8) ^a	51
Major city, Not Go8	37
Regional	4
Prefer not to answer	1
Missing	7
Chief Investigator (CI) role ^b	
Grants currently held	
None	32
1–2	43
3–4	9
5–6	4
Missing	13
Proposals submitted in latest round	
None	15
1–2	49
3–4	22
5–6	2
Missing	12

Percentages may not add to 100% due to rounding.

^a Research intensive university part of the Group of Eight (Go8).

^b Funding rules stipulate a maximum of six grants per CI.

Table 2 Impact of grant writing on the researchers, by location of primary institution

Personal workloads	Row %	Researchers, n=215	
		Agree	Disagree
I give top priority to writing my proposals over my other work commitments			
Major city, Group of Eight (Go8) ^a		98	2
Major city, Not Go8		95	5
Regional		100	0
I give top priority to writing my proposals over my personal commitments			
Major city, Go8		90	10
Major city, Not Go8		83	17
Regional		89	11
I get stressed by the workload required to write my proposals			
Major city, Go8		92	8
Major city, Not Go8		95	5
Regional		89	11
I restrict any holidays with my family and friends to focus on writing my proposals			
Major city, Go8		90	10
Major city, Not Go8		86	14
Regional		89	11
Motivation to submit proposals			
I submit proposals each year because chance is involved in being funded			
Major city, Go8		75	25
Major city, Not Go8		72	28
Regional		89	11
I submit proposals to meet the academic performance requirements of my institution			
Major city, Go8		60	41
Major city, Not Go8		57	44
Regional		78	22
I feel pressure from my colleagues to submit proposals			
Major city, Go8		53	47
Major city, Not Go8		48	51
Regional		78	22

Missing data not shown. Row percentage may not add to 100 due to rounding.

^a Research intensive university part of the Group of Eight (Go8).

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Done
Title and abstract	1	(a) Indicate the study’s design with a commonly used term in the title or the abstract	Yes
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	Yes
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Yes
Objectives	3	State specific objectives, including any prespecified hypotheses	Yes
Methods			
Study design	4	Present key elements of study design early in the paper	Yes
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Yes
Participants	6	(a) Cohort study—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	N/A
		Case-control study—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls	N/A
		Cross-sectional study—Give the eligibility criteria, and the sources and methods of selection of participants	Yes
		(b) Cohort study—For matched studies, give matching criteria and number of exposed and unexposed	N/A
		Case-control study—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Yes
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Yes
Bias	9	Describe any efforts to address potential sources of bias	Yes
Study size	10	Explain how the study size was arrived at	Yes
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Yes
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	N/A
		(b) Describe any methods used to examine subgroups and interactions	Yes
		(c) Explain how missing data were addressed	Yes
		(d) Cohort study—If applicable, explain how loss to follow-up was addressed	N/A
		Case-control study—If applicable, explain how matching of cases and controls was addressed	N/A
Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy	Yes		
		(e) Describe any sensitivity analyses	N/A

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Yes
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Yes
		(b) Indicate number of participants with missing data for each variable of interest	Yes
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	N/A
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	N/A
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	Yes
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	N/A
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Yes
Discussion			
Key results	18	Summarise key results with reference to study objectives	N/A
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	N/A
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	N/A
Generalisability	21	Discuss the generalisability (external validity) of the study results	N/A
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.